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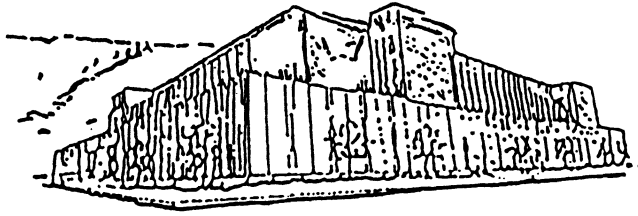
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Determination of Gender Roles in Activities that Occurred in Four Subsistence-
Related Activity Areas at a Late Prehistoric Bison Processing Site

by

Kristin Knop Hughes

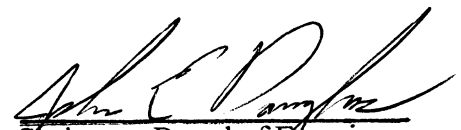
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1996

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Determination of Gender Roles in Activities that Occurred in Four Subsistence-Related Activity Areas at a Late Prehistoric Bison Processing Site

Chair: John Douglas

J.D.

The objective of this research is to attempt to define the gender associated with four subsistence-related activity areas the Fisher site, a Late Prehistoric bison processing site in Eastern Wyoming. Quantitative and statistical methods are used to analyze lithic tools, while debitage, ground stone tools, ornamental remains, potsherds, and bone fragments are considered qualitatively. Janet Spector's task differentiation approach is used to demonstrate the occurrence of specific activities, and to assign gender to particular activity sets within the activity areas. Ethnographic data on Plains tribes and the Nunamiut are also utilized for these purposes.

If the methods employed prove useful in determining gender roles from activity area analysis, they can highlight similarities and differences in the types of activities that males and females were pursuing as well as the material remains that reflect those activities. This, in turn, may aid archaeologists in attempts to reconstruct social processes among Northern Plains bison hunting groups on the Plains and elucidate our understanding of gender relations in prehistory, which may have been different than they were after European contact.

Acknowledgements

I would like to thank George Zeimens for providing me with the opportunity to use material from the Fisher Site as the basis for my thesis. I would also like to thank my parents for their enthusiasm for and support of my academic goals, and my husband for his patience and insightful suggestions.

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I. Introduction

The objective of this research is to attempt to define gender associated with four subsistence-related activity areas, or with particular components of these activity areas, from the Late Prehistoric component of the Fisher site, a bison-processing site near Fort Laramie, Wyoming. It is an attempt to define task differentiation between males and females, and is not intended to be a feminist critique or a critique on feminism.

Few attempts have been made by Plains archaeologists to assign gender to material remains. The determination of gender from activity area analysis is important for archaeologists to consider when interpreting human cultural remains because it can aid our understanding of gender relations and social processes. Although it has been established that the Plains region was occupied by nomadic societies which included hunters who are generally regarded as being male, analyses of activity areas that are not directly associated with the kill can provide information about both male and female activities that were carried out after the kill.

In order to investigate gender associated with activity areas at the Fisher site, material remains from four subsistence-related activity areas will be examined. Material remains to be analyzed include lithic tools and debitage, hammer stones, anvil stones, bone beads, and pot sherds. Faunal remains will be considered as well. A combination of quantitative, qualitative, and statistical methods will be used to analyze the data.

In the summer of 1992, I participated in excavations at the Fisher site, and from 1993 to 1995 I was an assistant field school instructor there. As a result, I have direct knowledge regarding the artifacts and features associated with the activity areas that will be analyzed.

After demonstrating the occurrence of specific activities, the task differentiation approach as outlined by Janet Spector (1983) will be used in an attempt to assign gender

to particular activity sets within the activity areas. Ethnographic data on Plains tribes and the Nunamiut will also be used for this purpose.

II. Site Setting and Description

The Fisher site (48GO359) (Figures 1 & 2) is a Late Prehistoric bison-processing site in the Western High Plains located in Goshen County, Wyoming, 12 km northwest of Fort Laramie. The site is situated in the Hartville Uplift range, lies along Cottonwood Draw (Figure 3), and is adjacent to a perennial spring. Cottonwood Draw, a first order drainage of the North Platte River, drains an area in excess of 15 km to the north. Cottonwood Draw frequently floods, and repeated flooding of the draw has cut back the stream bank, including the site, by about 33 meters. Excavations were begun in 1989 in order to salvage the site before additional loss could occur.



Figure 1. The Fisher Site

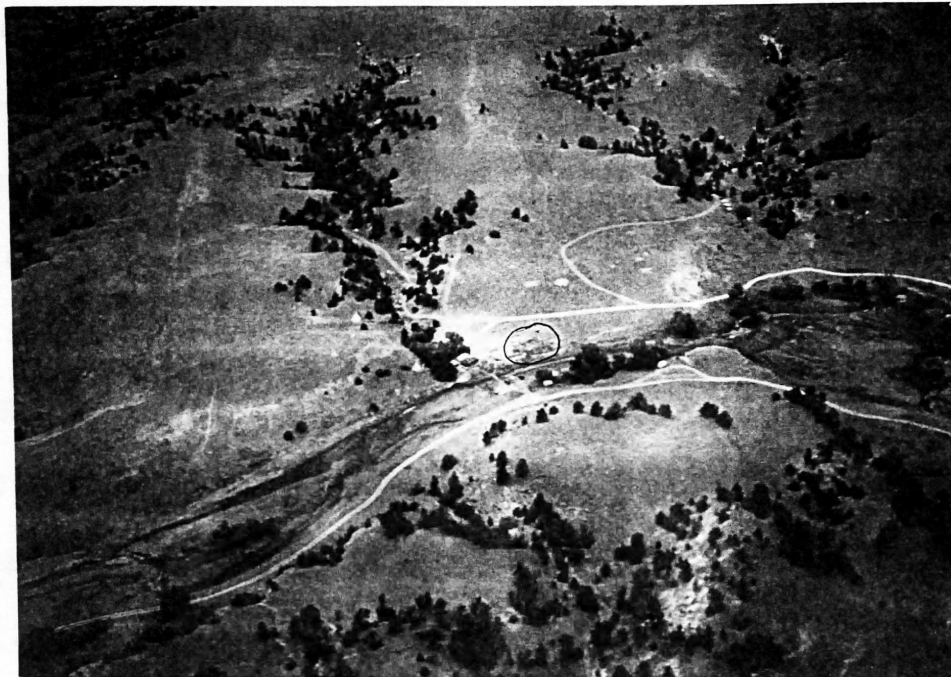


Figure 2. Aerial View of the Fisher Site



Figure 3. Cottonwood Draw

The site consists of at least seven cultural levels which are evident in stratigraphic profiles on the western margin of the site; however, it is likely that additional components

exist beneath those which have been excavated to date. The known levels have a chronological range from the historic period to 2,000 B.P., each reasonably well-separated horizontally by humic and non-humic strata. The majority of the material remains are from level six (Figure 4), which has been radiocarbon dated to around 508 B.P. (calibrated age) (Stuvier and Reimer 1993:215-230), placing it near the end of the Late Prehistoric Period on the High Plains as defined by Frison (1991:111). This Late Prehistoric level is the focus of the research presented in the pages that follow. The level contains well-preserved outside activity areas which, based on the patterning of material remains around several hearths, do not appear to have been confined to structures. The amount and types of material remains present seem to indicate that the level represents a single event, and that



Figure 4. The Late Prehistoric component of the Fisher Site

the site was occupied for a short period of time during the transition from late winter to early spring. Evidence which supports these conclusions is presented in the chapters that follow.

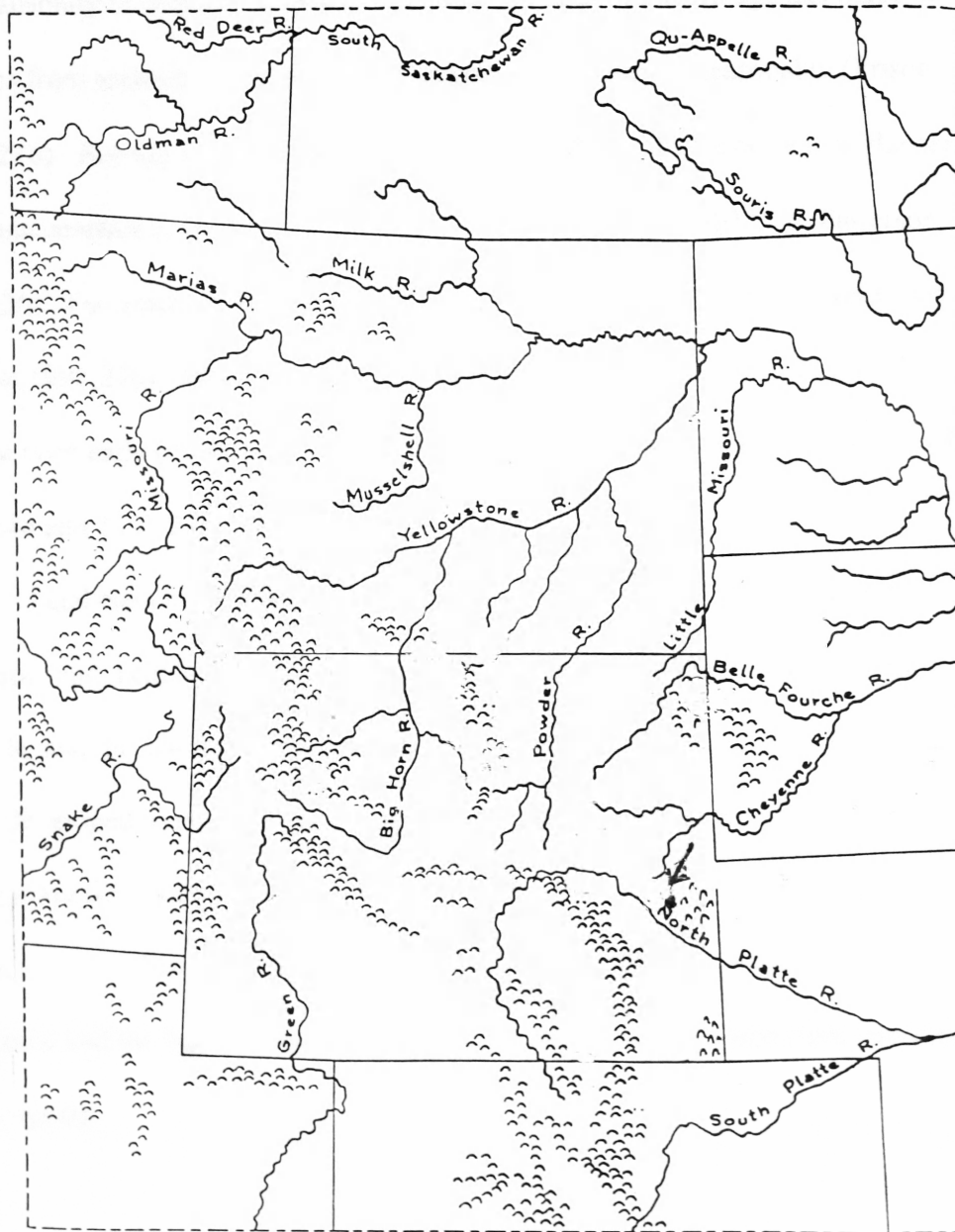


Figure 5. Location of the Fisher site in the Western High Plains (Frison 1991:112).

III. Excavation Results to Date

A. Seasonality

Bison fetal remains have been recovered from the Fisher site. According to Frison, the availability of collections of ungulate fetal material of known age has made such remains from archaeological contexts valuable in determining seasonality (Frison 1991:276). Rutting and birthing seasons remain constant from one year to the next for the big-game animals typically hunted in North America (Frison 1991:276; Patterson 1983:26). For example, most bison calves are born within a four to six week period (Frison 1991:276). While the majority of bison are born in late April or early May, a few will be born early (in early spring) and a few will be born late (in early summer) (Frison 1970:46 and 1991:276).

Fetal elements recovered from the Fisher site represent almost all parts of the skeleton, and include multiple radii, ulnae, scapulae, ribs, humeri, tibiae, and teeth. A skull, maxilla, and metacarpal are also represented. They range in stage of development from 60% developed to near full-term, the majority being approximately 90% developed. From what is known about the birthing season of bison calves, the nearly complete state of the majority of the fetal bison bone recovered from the Fisher site indicates that the site was occupied and the bison procured in late March during the transition from late winter to early spring.

B. Artifacts

A large number and wide variety of artifacts have been recovered from the Late Prehistoric component of the Fisher site. These include chipped stone tools and debitage, ground stone artifacts, pottery sherds, ornamental bone beads, and faunal remains.

Features associated with this component are limited to hearths. The artifact assemblage and hearths indicate that numerous subsistence-related activities associated with the processing of bison were carried out. Only the materials associated with the four activity areas under analysis (Activity Areas A, B, C, and D) will be discussed because these materials comprise the majority of material remains recovered, and therefore should be representative of the activities that occurred.

1. Chipped Stone

Over 115 lithic tools and thousands of pieces of debitage have been recovered from the Late Prehistoric component of the Fisher site. The majority consist of locally available raw materials, especially cherts and quartzites. These high quality materials are visible on the surface at hundreds of localities throughout the Hartville Uplift (Zeimens, personal communication 1993). The nearest source consists of chert beds that line a dry stream bed about two miles north of the site, and evidence of past quarrying activities is profuse. A variety of colors of both materials are represented at the site, including red, tan, brown, gray, white, yellow, and pink quartzite, and red, white, tan, brown, gray, green, yellow, blue, clear, and purple chert.

A smaller number of artifacts recovered from the Fisher site are made of red and gray metamorphosed shale. This material is also locally available, and is abundant in the Hartville formation (Pennsylvanian) in Guernsey, Wyoming, which is eight miles east of the site (Lageson and Spearing 1992:40).

Only three lithic artifacts and five pieces of debitage of non-local lithic materials have been recovered to date. These artifacts are made of obsidian and include a projectile point, preform, and mid-section of a knife.

Most projectile points recovered are of the Avonlea type, which are common to the Plains and were arrow points (Frison 1991:111). Avonlea points recovered from the Fisher site are similar to those recovered at other Late Prehistoric bison kill and processing sites in the area, including the Beehive Butte, Wardell, and Vore sites (Frison 1991:114, 215, and 229). Of the fourteen points recovered, seven are side-notched, six are tri-notched, and one is un-notched. The bases of the side-notched points vary from straight, to angled, to concave. Other lithic tools recovered from the site include 15 preforms, 17 side and end scrapers, 4 knives, 10 utilized flakes, a drill, and 32 bifacial chopping and cutting tools (Figure 6).

2. Ground Stone

Like the majority of chipped stone artifacts, the ground stone artifacts recovered from the Late Prehistoric component of the Fisher site are made of locally available materials. These include schist, quartzite river cobbles, and sandstone. To date, at least seventeen anvil stones, seven hammer stones, and two shaft abraders have been recovered.

Anvil stones are present in all four activity areas analyzed, while hammer stones are present in activity areas A and C. The majority of the anvil stones were associated with long bone

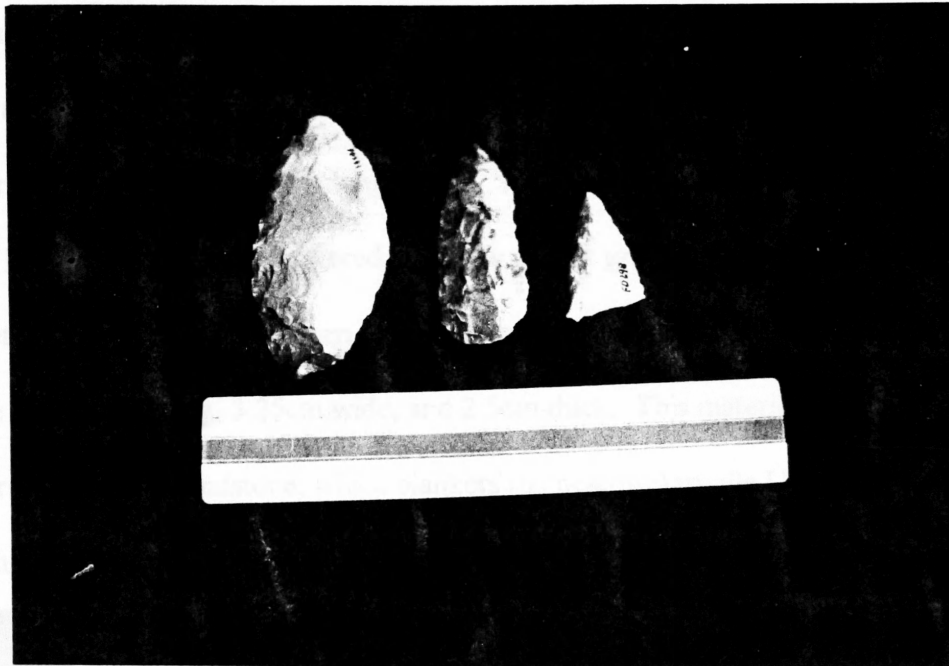


Figure 6. Knives from the Fisher site.

shaft segments and tiny bone fragments and splinters; however, one was associated with a concentration of lithic debitage.

The anvil stones (Figure 7) are characterized by a flat working surface, are square to rectangular in shape, and exhibit peck marks, scarring, and other evidence of impact (see Jodry and Stanford 1992:125 and 126). Eight are made of slabs of dark gray schist, eight consist of gray, white, and pink quartzite river cobbles, and one is made of

sandstone. The anvil stones range in size from 15-31cm long, 12-24cm wide, and 3-12cm thick.

The majority of the hammer stones recovered consist of gray quartzite river cobbles, while fewer are made of tan and gray schist. All have at least one rounded end and contain evidence of use-wear on at least one end and side (Figure 8), damage which is known to occur after heavy percussion (Jodry and Stanford 1992:125). The hammer stones range in size from 7-10cm long, 3.25-9.5cm wide, and 2-4.5cm thick.

Both shaft abraders recovered are made of soft gray and tan sandstone. One is complete, while the other is broken into nine fragments. The complete shaft abrader (Figure 9) is 4.5cm long, 3.25cm wide, and 2.5cm thick. This material is probably Arickaree formation sandstone, which blankets the nearby Hartville Uplift (Lageson and Spearing 1992:40).

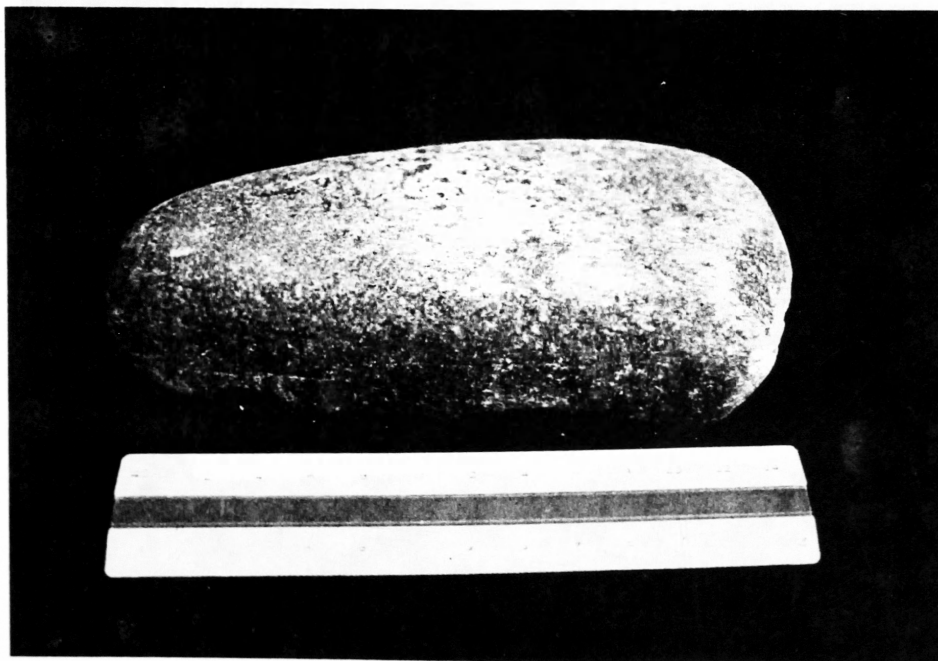


Figure 7. Anvil stone from the Fisher site.



Figure 8. Hammer stone from the Fisher site.

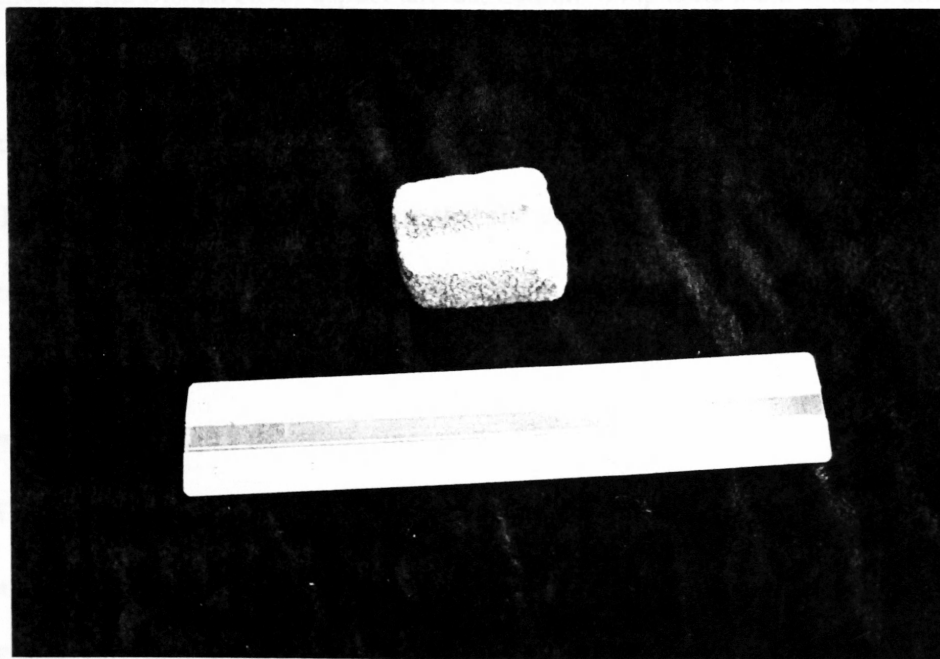


Figure 9. Shaft abrader from the Fisher site

3. Pottery

To date, thirteen of the forty-seven pottery sherds recovered from the Late Prehistoric component of the Fisher site have been refitted, and they represent two different types of pottery: Plains Apache Dismal River aspect and Eastern Shoshone/Intermountain Tradition.

The Dismal River pottery is characterized by a gray-black color, a smooth surface, gritty paste, and it is undecorated. Nine Dismal River sherds have been refitted and are all part of the same vessel. The Dismal River aspect sherds recovered from the Fisher site are thinner and composed of smaller-sized temper material than the Intermountain Tradition sherds recovered.

The Intermountain Tradition sherds recovered are tan, brown, and gray; are very thick relative to the Dismal River aspect sherds; contain nonplastic inclusions of differing sizes as temper, including small pebbles; have rough surfaces; and lack any decorative surface treatment. Four sherds were refitted, and they may represent two different vessels. Two of the refitted sherds indicate that the vessel was flat-bottomed. The sherds fit the description of Intermountain Tradition pottery provided by Frison (1991:116-117).

4. Ornamental

To date, nine polished ornamental bone beads have been recovered from the Late Prehistoric component of the Fisher site (Figure 10). The beads are made from long bone shafts of birds and other small game animals. The holes in the beads vary in shape: one is circular, one is square, three are oval, and four are triangular. The variation is probably a

result of natural variations in the shapes of the bones. One bead is grooved around the circumference, which may indicate that a string of leather or sinew was tied around it for some time.

The beads range from .8 to 2.6cm in length and .8 to 1.1cm wide, and eight beads are at least four times as long as they are wide. Eight of the beads are well preserved, while one extremely thin bead was found in two pieces. All nine were found in three adjoining units in activity area A. Similar beads have been recovered from Dismal River sites in western Nebraska and northeastern Colorado (Gunnerson 1978:173-4 and 198-200).

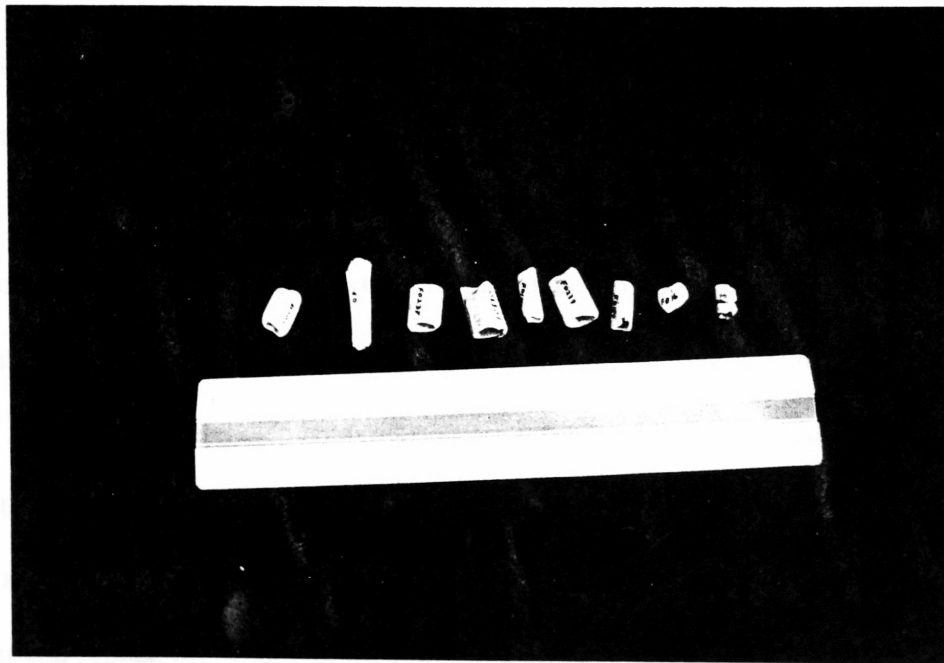


Figure 10. Bone beads from the Fisher site.

C. Faunal Remains

The amount of bone is greater than that of any other material recovered from the Late Prehistoric component of the Fisher site, which suggests that the majority of activities that occurred at the site were related to the processing of bison products. Almost all of the bone is in a very good state of preservation, and the lack of evidence for exposure to the elements or carnivore damage indicates that it probably became buried fairly rapidly after the site was abandoned.

Thousands of splinters and tiny fragments, as well as over 300 more complete bones, have been recovered (Figure 11). The majority of bones represent bison; however, deer, tree shrew and other rodent bones, two bird bones, and an articulated snake skeleton are present as well. Most of the bones recovered are unburned, and the burned elements are limited to ribs, foot bones, and unidentifiable fragments. The faunal remains probably reflect primary context because articulated finds contextually associated with the more fragmentary remains are limited to vertebral elements and portions of lower limb bones which are relatively resistant to natural deterioration (see Jodry and Stanford 1992:117).

Almost all skeletal elements of bison are present, although caudal and cranial elements, jaws, and vertebrae are represented by fewer elements than are limb bones, foot bones, and ribs. Most of the limb bones are highly fragmented, and have at least one articular end broken off. Many of the foot bones are unbroken, and some are burned. The low frequency of cranial elements and relative abundance of post-cranial elements suggests that the animals were killed elsewhere and the desirable parts were brought back to the site to be processed.



Figure 11. A portion of the bone bed at the Fisher site.

D. Features: Hearths

Four hearths are present in the Late Prehistoric component of the Fisher site, and each one is associated with a distinct activity area. The hearths are believed to represent a single event due to their cooccurrence in the same stratigraphic level at the site. Due to the abundance of refuse associated with the hearths, as well as the lack of evidence for structures around them, it is assumed that they were outside hearths. These include hearths A, B, C, & D, located respectively in activity areas A, B, C, and D.

Hearth A (Figure 12) is 7cm deep, has a flat bottom with tapered edges, and is lined with nine large, closely spaced stones. This hearth contained a substantial amount of charcoal and burned soil. Two radiocarbon dates were obtained from charcoal samples

taken from this hearth. The uncorrected dates are 440 \pm 60 B.P. and 480 \pm 70 B.P., while the calibrated date at the one sigma interval is 508 B.P. (see Stuvier and Reimer 1993:215-230).

Hearth B (Figure 13) is roughly circular in shape and is completely lined with 7 stones which are spaced close together. Hearths C and D (Figures 14 and 15) are semi-circular in shape, are lined with 10 and 11 closely spaced stones respectively, and contain burned soil within and around them. The lack of stones on the western side of hearth C and the eastern side of hearth D suggests that these were the down wind margins of the hearths (see Binford 1978:349). The hearths resemble those present at other Late Prehistoric period sites in Wyoming such as the Bugas-Holding site (Rapson 1990:127).

E. Paleobotanical remains

To date, the only paleobotanical remains recovered from the Fisher site are large tree roots and root cavities, which suggest that trees existed on or near the site during the time it was occupied.

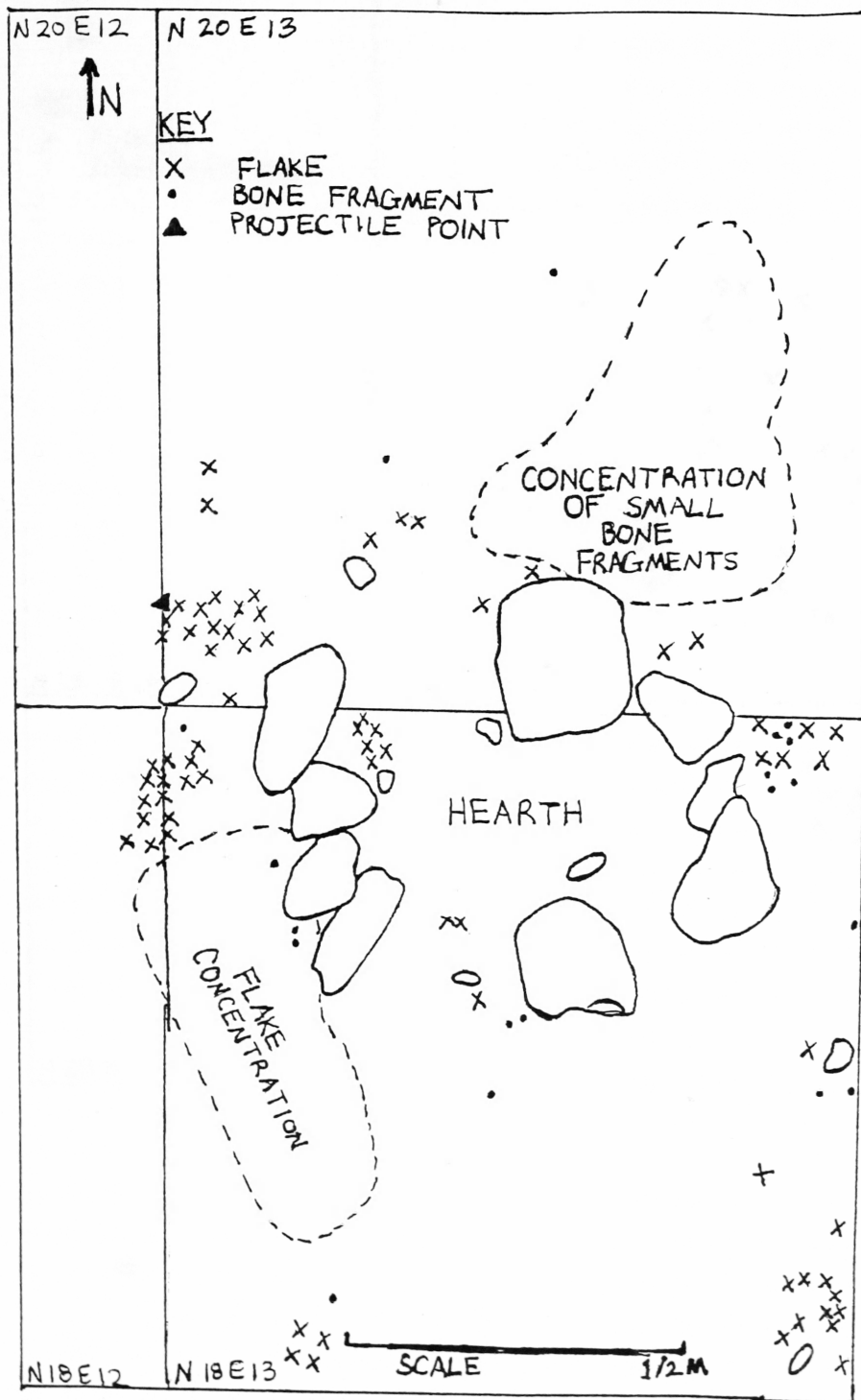


Figure 12. Hearth A.

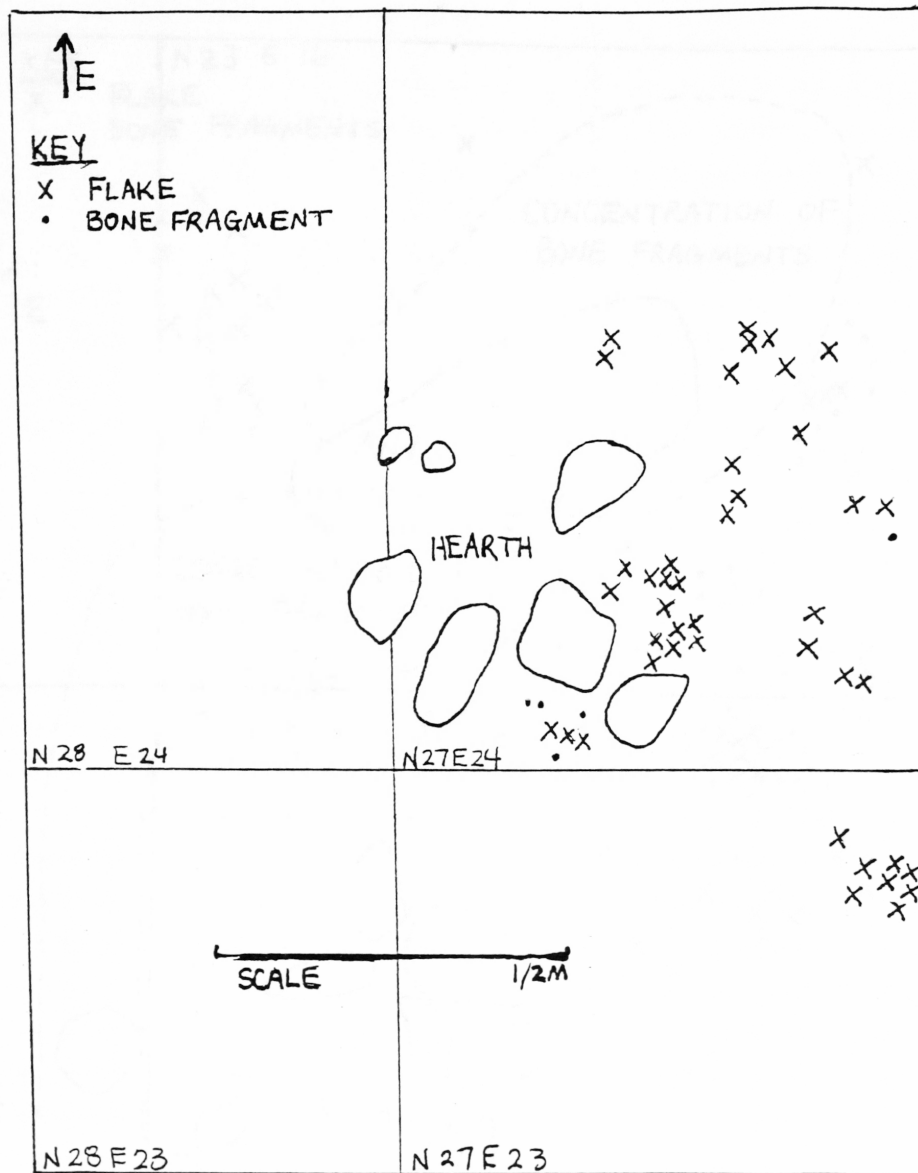


Figure 13. Hearth B.

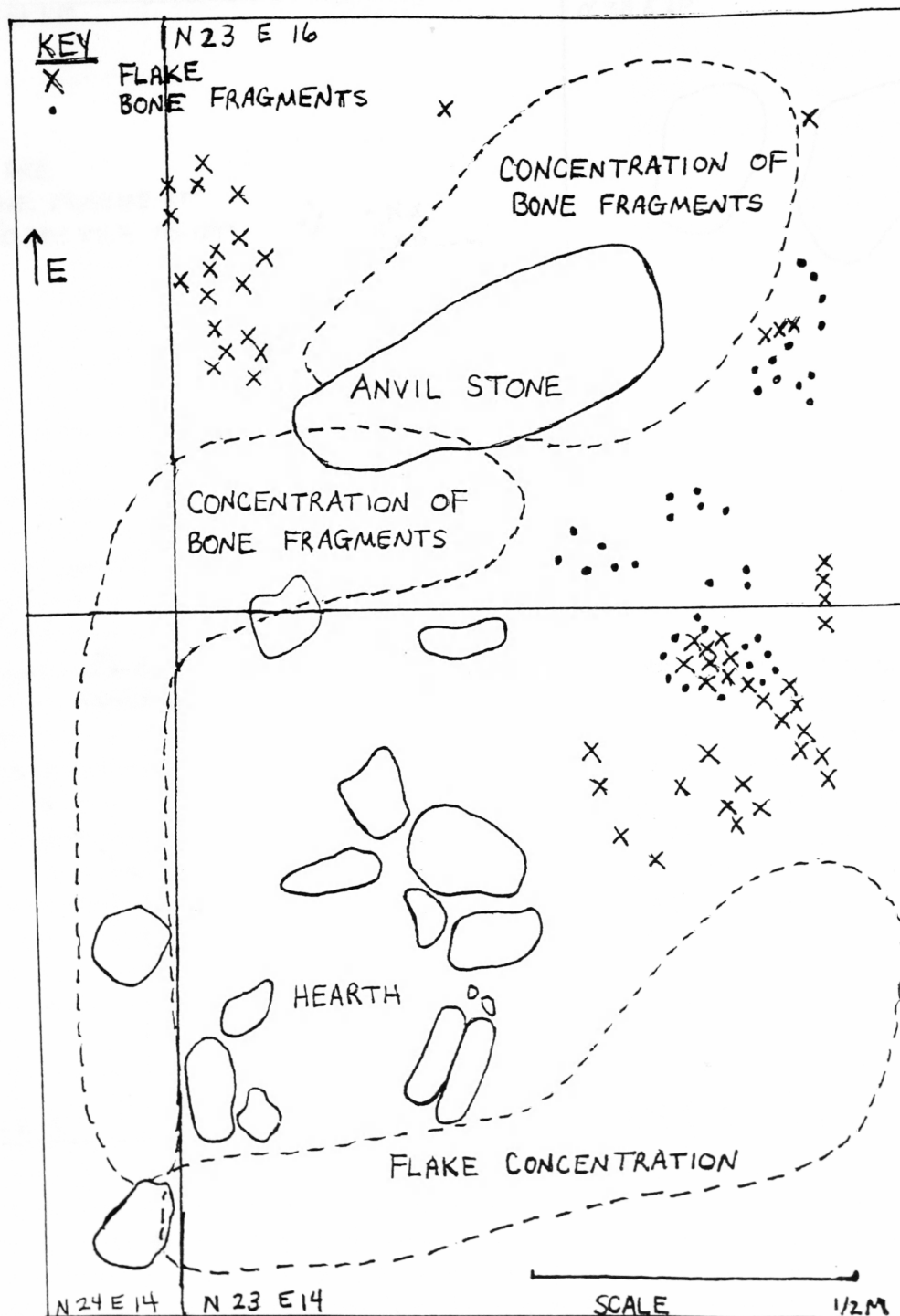


Figure 14. Hearth C.

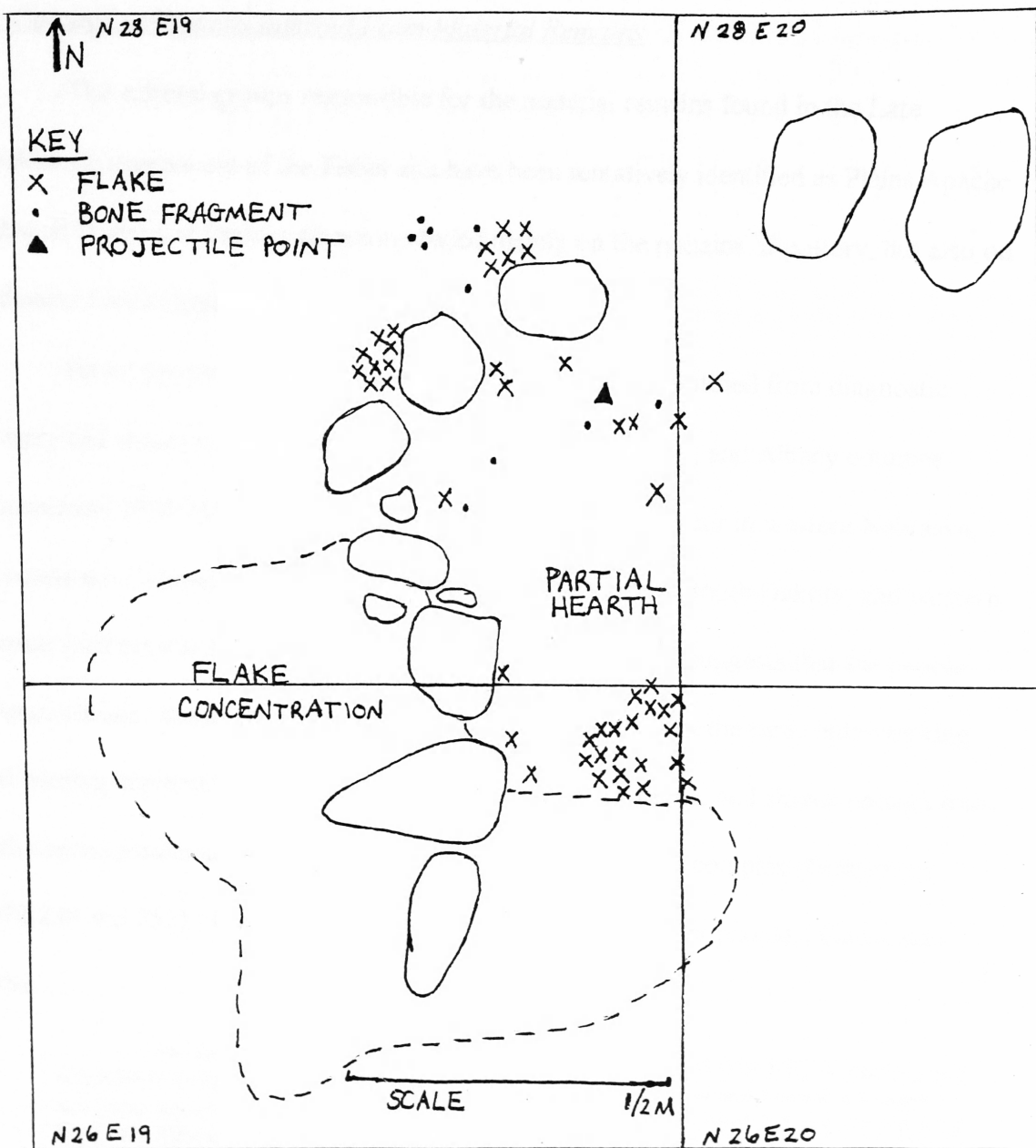


Figure 15. Hearth D.

F. Cultural Affiliations Inferred From Material Remains

The cultural groups responsible for the material remains found in the Late Prehistoric component of the Fisher site have been tentatively identified as Plains Apache (Dismal River) and Eastern Shoshone based mainly on the remains of pottery, but also on a distinct type of knife and ornamental bone beads.

Plains Apache Dismal River aspect sites have been identified from diagnostic pottery and sherds in southeastern Wyoming in Platte, Goshen, and Albany counties (Gunnerson 1978:236-237). Dismal River aspect sites also occur in western Nebraska, northeastern Colorado, southeastern Colorado, southwestern South Dakota, and western Kansas (Gunnerson 1978:209-238). Archaeological evidence suggests that the people who produced Dismal River aspect artifacts possessed basically the same hide-working and hunting implements used by other Plains groups at this time, and shared enough traits with contemporaneous Plains groups to be considered a Plains complex (Gunnerson 1978:239 and 252). Concerning the subsistence of Dismal River peoples, Gunnerson states:

The Dismal River people had a subsistence economy based primarily on hunting and secondarily on agriculture. Bison appears to have been the chief animal hunted, although numerous deer and beaver bones are also found...there is no evidence of fish and very little of fowl. The Dismal River people apparently made use of wild plant foods. Remains of plums, chokecherries, hackberries, and black walnuts have been found. The evidence that these people worked skin is indirect, but abundant. A large proportion of chipped-stone artifacts such as scrapers and knives were probably skin-working tools (1978:245).

Although Dismal River peoples exploited a wide variety of lithic raw materials, they most frequently utilized locally available sources, the most common types being chert, quartzite, and sandstone (Gunnerson 1978:246). Types of stone not locally available yet

occasionally found associated with Dismal River sites include obsidian and quartz (Gunnerson 1978:246).

Although no archaeological information regarding the wardrobe of the Dismal River people has been recovered, the occurrence of beads at many Dismal River sites suggests that they were used for purposes of adornment (Gunnerson 1978:250). The majority of beads recovered from Dismal River sites are made from tubular portions of bone, and are about five times as long as they are wide (Gunnerson 1978:250), as are those recovered from the Fisher site.

When Gunnerson published his work in 1960, the Dismal River aspect was believed to have existed only from about A.D. 1675 to 1725 (Gunnerson 1978:238); however, Dismal River pottery from the Fisher site contextually associated with a level that has been radiocarbon dated to about 508 B.P.

Intermountain Tradition pottery has also been recovered from the Late Prehistoric component of the Fisher site. This pottery is a “valuable cultural marker” of Eastern Shoshone peoples (Frison 1991:116). Intermountain Tradition pottery is characterized by a flat bottom, is shaped like a flower pot, and has a flanged base (Frison 1991:116). Shoshonean pottery from Late Prehistoric sites on the Northwestern Plains has been radiocarbon dated to 750 B.P. and younger (Frison 1991:117), a time range that includes the Late Prehistoric component of the Fisher site. Intermountain Tradition pottery is generally thick and poorly fired, and consists of various sizes of ungraded tempering materials. Most Intermountain Tradition vessels lack decorative surface treatment (Frison 1991:116).

In addition to distinctive types of pottery, a diagnostic bifacial tool found in the Late Prehistoric component of the Fisher site indicates that Shoshone peoples were at least partially responsible for the material remains recovered. According to Frison, this bifacial tool was used as a knife, and is a reliable horizon marker for late Shoshone occupations (1991:132-133).

Explanations for why artifacts from two distinct cultural groups are represented at the Fisher site include inter-marriage, trade, or seasonal aggregation. Plains societies that inhabited this and other areas often aggregated during the summer for the purpose of communal bison hunting (Reher 1977:22), however, because the Fisher site was not occupied during this season, seasonal aggregation is not a likely explanation for the presence of two groups at the site. It is possible that the groups ran out of stored food toward the end of winter and cooperated in killing several bison to avoid starvation, as nearly all parts of the bison, including those with extremely little meat and marrow content, were processed at the site. It is also possible that a multiethnic group occupied the site, or that Plains Apache or Eastern Shoshone artifacts were acquired through trade.

IV. Spatial Analysis

A. Activity Areas

Information regarding the organization of labor can be acquired from contextual data, such as activity areas or activity sets (Flannery and Winter 1976:35). Flannery and Winter define activity areas as “spatially restricted areas where a specific task or series of related tasks has been carried on” (1976:34). Activity areas can be recognized by the presence of clusters of artifacts, raw materials, waste products, and one or more features (Flannery and Winter 1976:34), and the clusters of artifacts within activity areas should be variable in content and represent the activities that were carried out (Simek 1989:59). The specialized tool kits used in carrying out specific activities are termed “activity sets” (Flannery and Winter 1976:34), and should consist mainly of the tools utilized at a particular location to perform the specific task inferred from archaeological remains (Simek 1989:59).

The basis of spatial analysis in archaeology is the identification of spatial patterning among archaeological remains, with the ultimate goal of recognizing distinct spatial patterns (Rapson 1990:5). The use of spatial analysis as a means of determining the existence of activity areas and their boundaries has become a common part of archaeological investigations which seek to answer questions regarding activity areas (Binford 1964; Flannery and Winter 1976; Kent 1980).

Activity areas can be defined by recording the location of features and the density of artifacts within a site. After determining their existence, activity areas must be

identified in terms of the coordinates of the units in which they are found, after which the types of activities that occurred in each area may be defined (Patterson 1983:44).

The idea that spatial patterning within activity areas supplies archaeologists with data from which prehistoric behavior can be inferred is not without its problems (Breternitz 1982:37). Schiffer stresses that the patterns observed among archaeological remains are not always a true representation of how these materials were structured by the people who left them, as natural formation processes such as erosion may have affected them after the site was abandoned (1976:42-43). Due to the co-occurrence of material remains of different sizes and weights throughout the Late Prehistoric component of the Fisher site, the large number of extremely small flakes and bone fragments recovered, and the presence of intact features, it seems that the spatial locations of activity sets identified reflect primary deposition and were only minimally affected by natural root movement and large scale size-sorting processes (see Jodry and Stanford 1992:154). Cultural transformations appear to have been minimal as well, with some evidence that hearths were cleaned out was the only observable human induced transformation.

B. Ethnoarchaeology

1. General

Ethnoarchaeology involves the study of contemporary or ethnographically known societies to arrive at an understanding of the relationships that exist between the material and non-material limits of behavior (Spector 1983:78). Although information obtained from ethnoarchaeological studies is not universally applicable, it can help archaeologists

interpret cultural patterning in the archaeological record (Kent 1952:198, Moore 1982:74, Yellen 1977a:2 and 1977b:273). In addition to providing a means of identifying and describing behavior that effects spatial patterning within sites, ethnoarchaeology allows for the application of these findings to analyses of behavior (Gamble 1991:4, O'Connell, et.al. 1987:75).

2. *What has been learned from ethnoarchaeological studies*

The Nunamiut of Alaska are similar to past Plains societies in that they rely on stored food for part of the year, hunt large game animals, and consist of food-acquisition groups which are logistically organized (Binford 1980:10). Due to these similarities, ethnoarchaeological data concerning them is appropriate to consider in the study of Plains sites, and will be considered when interpreting activity areas at the Fisher site.

In his ethnoarchaeological study of the Nunamiut, Binford found that when several individuals are working around a hearth, they drop and toss refuse in a circular arrangement around it (Binford 1978:345 and 1983:153). Binford observed Nunamiut men extracting marrow from the bones of caribou, and witnessed three different methods of refuse disposal associated with activities located around outside hearths (1983:156). These include dropping individual items at the locus of use, tossing individual items away, and tossing large amounts of accumulated refuse items (Binford 1983:156). Dropped items were situated within 20cm of the front of a seated worker, while tossed items averaged 1.14m from the kneecaps of seated workers (Binford 1978b:349). The same

pattern of debris occurs as a result of stone tool manufacture and modification, although flakes are present instead of bone fragments (Binford 1983:153).

Binford refers to the area in which this debris accumulates as the *drop zone*, which is to be distinguished from the *toss zone*, an area immediately behind the seated workers at a hearth where larger pieces of bone are tossed after marrow extraction (1978:345, 1983:153). Like drop zones, toss zones are characterized by a circular arrangement if more than one individual was involved in the task (Binford 1983:153). Dropping and tossing, whether carried out by one or many individuals, both result in primary refuse (Binford 1978:347). While 90% of bone splinters and 100% of bone chips were dropped, almost 94% of the larger articular ends were tossed (1978:337). In addition to being dropped or tossed, items may be rested, placed, or dumped (Binford 1978:345-346); however, rested and placed items rarely become a part of the archaeological record (Binford 1978:327).

In his ethnoarchaeological studies of the !Kung, John Yellen found that the spatial distribution of particular activities is indeed patterned, and the tool kits and debris associated with different activities form clusters that can be recognized on the ground (Yellen 1977a:95). A re-analysis of the same data confirmed that a uniform pattern of activities took place throughout the site, that specific activities were centered around hearths, and that spatial organization created by past human behavior may be preserved for the most part, with minimal disturbance from natural processes during its conversion into an archaeological site (Gregg, et.al. 1991:194 and 195).

The majority of material remains present at short-term occupation archaeological sites created by nomadic peoples are likely to reflect the activities which occurred shortly before the site was abandoned. According to Fisher and Strickland,

...the food debris and other material items lying beside fires and elsewhere in the central open area had been deposited during the final days or hours that the camp was occupied, and thus portray with fine-grained resolution activities that were carried out at the end of the campsite's lifespan (Fisher and Strickland 1991:223).

These material remains should represent what Marc Stevenson terms the "abandonment phase" of workshop/habitation sites (1985:67). Activities performed during the abandonment phase of site occupation generally include the manufacture, maintenance, and repair of tools, and are intense but of short duration and minimal diversity (Stevenson 1985:65). Refuse from abandonment phase activities should mainly represent primary debitage, and tools within the refuse are generally made from locally available materials, and are at or near the end of their use-life (Stevenson 1985:65, 67).

Binford's work with the Nunamiut revealed that refuse resulting from activities that generate large amounts of waste is likely to remain *in situ* at short-term occupation sites (1983:187); however, assemblages of artifacts recovered from activity areas at short-term campsites only directly reflect the actions of a past behavioral system as it constantly acts upon the materials it has produced (Binford 1964:425, Stevenson 1991:292).

Ethnoarchaeological data gathered by Yellen (1977b) indicates that activity areas may be rare in the archaeological record, particularly among foragers who inhabit middle and low latitudes (O'Connell et.al. 1991:61). For this reason, it may be advantageous to study spatial patterning among sites left by nomadic peoples, as they tend to create

relatively small sites (Gamble 1991:1), and are less likely to engage in systematic clearing of refuse than semi-sedentary peoples who occupy sites for longer periods of time (Stevenson 1991:276).

The amount and types of material remains present seem to indicate that the Late Prehistoric component of the Fisher site represents a single event. Because the Fisher site appears to have been occupied by nomadic peoples who stayed at the site just long enough to process the meat, bones, and hides, of the bison they killed, as well as the contextual co-occurrence of large and small material items throughout the site, it is assumed that the material remains are in primary context. The types of refuse and tools present are similar to what Stevenson suggests represent the abandonment phase of site occupation (1985:65 and 67), which implies that the most visible activities at the Fisher site reflect tasks carried out shortly before the site was abandoned.

3. Tool Use and Spatial Patterns

In his study of how information regarding tool usage can be employed in spatial analyses, Lawrence Keeley highlights several factors that affect when and where a tool will be discarded (Keeley 1991:257). These include: a) formal clean-up and casual tossing of refuse from highly used domestic areas, b) the amount of time that the site was occupied and the timing of particular activities within the overall length of occupation, and c) the retooling of hafted artifacts (Keeley 1991:258). He found that small, unhafted tools made of locally available raw materials which refit to the same core were most likely to be disposed of in the locus of use (Keeley 1991:263). Butchering implements had the highest

probability of having been used *in situ*, while projectile points and other hafted tools had a probability near 0, and hide-scraping tools had probabilities ranging from 0 to 18.8% (Keeley 1991:264). Because most of the tools recovered from the Fisher site are unhafted, made of locally available materials, and are contextually associated with refuse typically produced by their use, it is assumed that the tools were discarded at or near the locations where they were used.

C. Methods

Although many methods for analyzing spatial patterning among artifacts are available for use by archaeologists, due to the relatively small number of stone tools involved in the present analysis, the Poisson and chi-square methods are employed. Poisson is a quadrat method of point pattern analysis that tests for randomness (Hodder and Orton 1976:33). It is the oldest method for recognizing non-randomness in the patterning of objects within a study area (Carr 1984:140). The method was first used by plant ecologists (Carr 1984:140), but has also been employed by archaeologists in the study of distributions of tool types (Brose and Scarry 1976, Dacey 1973, Hodder and Orton 1976:35, Whallon 1973).

Four activity areas, Activity Areas A, B, C, & D were analyzed. Each activity area under investigation was divided by a fixed grid of squares, into which the number of occurrences in each square, which in this case is stone tools, is documented (Hodder and Orton 1976:33). The number of units containing 0,1,2,3,4, and 5 or more stone tools was counted, and the Poisson function calculated to test for randomness.

To determine whether observed frequencies of tools in each activity area was random, the variance to mean ratio (v/m) for the occurrence of stone tools in each area was calculated. If a distribution of tools is random, v/m will be equal to 1, while a regular distribution is indicated by a v/m ratio <1 , and a clustered distribution by a v/m ratio >1 (Hodder and Orton 1976:33). Tests for significance are based on comparisons of the index of dispersion $(v/m) \times (n-1)$, where n is the number of quadrats, with the χ^2 statistic for $n-1$ degrees of freedom (Moore and McCabe 1989:A-20).

The chi-square statistic has also been employed by archaeologists to test for randomness among observed locations of artifacts (Kent 1952:165-166). It is based on having large samples, and is most appropriate to use when the average of expected counts is greater than or equal to five, and when the smallest expected count is greater than or equal to one (Moore and McCabe 1989:619).

D. Results

The chi-test probabilities for randomness among observed locations of tools at the Fisher site are not strong, however, this could be a result of an average expected count of less than five and a smallest expected count of less than one (Tables 5 and 6). On the other hand, the v/m ratios for all four activity areas analyzed are all greater than one, indicating that clusters of artifacts occur in each activity area (Tables 5 and 6).

ACTUAL:							
	AREA A	AREA B	AREA C	AREA D	A,B,C,&D	TOTALS:	
P. Points	7	9	4	11	31	1	
Bifaces	10	4	10	8	32	1	
Preforms	4	2	3	6	15	1	
Used Flak	2	2	5	1	10	1	
Scrapers	2	4	7	4	17	1	
Other Tool	1	1	6	2	10	1	
Total Tools	26	22	35	32	115	1	
PROPORTIONS:							
			AREA A	AREA B	AREA C	AREA D	
P. Points:			0.23	0.29	0.13	0.36	
Bifaces:			0.31	0.13	0.31	0.25	
Preforms:			0.27	0.13	0.2	0.4	
Used Flakes:			0.2	0.2	0.5	0.1	
Scrapers:			0.12	0.24	0.41	0.24	
Other Tool			0.1	0.1	0.6	0.2	
MEANS:							
			AREA A	AREA B	AREA C	AREA D	A,B,C,&D
MEAN # of Tools per unit			1.37	1.22	1.4	1.231	1.31
MEAN # of Tools per area			NA	NA	NA	NA	28.75
STANDARD DEVIATIONS:							
			AREA A	AREA B	AREA C	AREA D	A,B,C,&D
Tools			1.95	1.6	1.66	1.4	1.62
# UNITS PER AREA:			AREA A	AREA B	AREA C	AREA D	A,B,C,&D
			19	18	22	23	82

Table 1. Observed numbers, proportions, means, and standard deviations of stone tools.

Unit #	ACTIVITY AREA A		ACTIVITY AREA B		ACTIVITY AREA C		ACTIVITY AREA D	
	# Tools	# Types	# Tools	# Types	# Tools	# Types	# Tools	# Types
1	1	1	0	0	1	1	1	1
2	3	3	1	1	1	1	1	1
3	0	0	1	1	1	1	1	1
4	0	0	1	1	1	1	6	3
5	5	3	1	1	1	1	1	1
6	1	1	1	1	2	2	1	1
7	1	1	1	1	1	1	1	1
8	5	2	0	0	0	0	0	0
9	1	1	0	0	2	1	1	1
10	6	3	4	2	0	0	0	0
11	1	1	3	3	0	0	0	0
12	0	0	1	1	0	0	1	1
13	0	0	6	3	2	1	0	0
14	0	0	0	0	2	2	1	1
15	2	1	0	0	1	1	3	2
16	0	0	2	2	2	1	2	2
17	0	0	0	0	5	2	1	1
18	0	0	1	1	7	4	2	2
19	0	0	NA	NA	3	2	1	1
20	NA	NA	NA	NA	0	0	0	0
21	NA	NA	NA	NA	1	1	2	2
22	NA	NA	NA	NA	2	2	1	1
23	NA	NA	NA	NA	0	0	4	2

Table 2. Tools and tool types within each activity area.

NON-LITHIC ARTIFACTS		AREA A	AREA B	AREA C	AREA D	A,B,C,&D
Ground Stone Tools						
	Hammer stones	3	0	4	0	7
	Anvil stones	2	5	4	6	17
	Shaft abaraders	0	0	2	0	2
Bone artifacts						
	Beads	9	0	0	0	9
Ceramics						
	Pottery sherds	0	0	13	0	13
HEARTHES		1	1	1	1	4

Table 3 Non-lithic artifacts

POISSON CALCULATIONS					
	#tools/unit	observed	poisson probability	expected	frequency
ACTIVITY AREA A:		frequency			
DF=12	0	8	0.25	4.83	2.08
MEAN=1.37	1	6	0.35	6.61	0.06
sum=36.4	2	1	0.24	4.53	2.75
X=6.03	3	1	0.11	2.07	0.55
	4	0	0.04	0.71	0.71
	5+	3	0.01	0.25	30.25
		19	1	19	36.4
					x =6.03
ACTIVITY AREA B:	0	6	0.3	5.31	0.09
DF=20	1	8	0.36	6.48	0.36
MEAN=1.22	2	2	0.22	3.95	0.96
sum=8.3367	3	0	0.09	1.61	1.61
X=2.89	4	1	0.03	0.49	0.53
	5+	1	0.01	0.15	4.82
		18	1.01	17.99	8.34
					x =2.89
ACTIVITY AREA C:	0	8	0.25	6.17	0.54
DF=20	1	9	0.35	8.63	0.02
MEAN=1.4	2	5	0.24	6.04	0.18
sum=3.05	3	1	0.11	2.82	1.17
X=1.75	4	1	0.04	0.99	0.0001
	5+	1	0.01	0.36	1.14
		25	1	25.01	3.05
					x =1.75
ACTIVITY AREA D:	0	6	0.29	7.6	0.37
DF=21	1	14	0.36	9.35	2.31
MEAN=1.23	2	3	0.22	5.75	1.32
sum=7.65	3	1	0.09	2.36	0.78
X=2.77	4	1	0.03	0.73	0.1
	5+	1	0.01	0.22	2.77
		26	1	26.07	7.65
					x =2.77

Table 4 Poisson calculations.

Observed numbers of Lithic Tools: Activity Area A						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>totals</u>
<u>1</u>	1	0	5	0	0	6
<u>2</u>	3	5	6	0	0	14
<u>3</u>	0	1	1	2	0	4
<u>4</u>	0	1	1	0		2
<u>5</u>		1				1
totals	4	8	13	2	0	27
Expected numbers of Lithic Tools: Activity Area A						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>		<u>totals</u>
<u>1</u>	0.92	1.62	3	0.46		6
<u>2</u>	2.15	3.77	7	1.08		14
<u>3</u>	0.62	1.08	2	0.31		4.01
<u>4</u>		0.54	1	0.15		1.69
<u>5</u>		0.27				0.27
totals	3.69	7.28	13	2		25.97
Observed numbers of Lithic Tools: Activity Area B						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>totals</u>
<u>1</u>			1	1		2
<u>2</u>			0	5	0	5
<u>3</u>		1	0	0		1
<u>4</u>	0	1	4	0		5
<u>5</u>	1	1	3	2	1	8
<u>6</u>		1				1
totals	1	4	8	8	1	22
Expected numbers of Lithic Tools: Activity Area B						
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>totals</u>
<u>1</u>			0.89	0.76		1.65
<u>2</u>			2.22	1.9	0.24	4.36
<u>3</u>		0.19	0.44	0.38		1.01
<u>4</u>	0.24	0.95	2.22	1.9		5.31
<u>5</u>	0.44	1.77	3.56	3.56	0.44	9.77
<u>6</u>		0.19				0.19
totals	0.68	3.1	9.33	8.5	0.68	22.29
ACTIVITY AREA A:			ACTIVITY AREA B			
CHITEST TOOLS:			CHITEST TOOLS:			
TOOLS:			TOOLS:			
	MEAN	1.22		MEAN	1.37	
	STDEV	1.44		STDEV	1.92	
	V/M	1.18		V/M	1.4	
	SIGNIF	>.25		SIGNIF	0.13	

Table 5. Chi squared Distributions, v/m ratios, and significance tests
Activity Areas A and B

	Observed numbers of Lithic Tools: Activity Area C								
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>totals</u>		
<u>1</u>					2	1	3		
<u>2</u>		1	0	0	5	2	8		
<u>3</u>	1	1	2	2	7	0	13		
<u>4</u>	1	2	0	2	3	0	8		
<u>5</u>	1	1	0	1	0	0	3		
totals	3	5	2	5	17	3	35		
	Expected numbers of Lithic Tools: Activity Area C								
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>totals</u>		
<u>1</u>					2.04	0.36	2.4		
<u>2</u>		1.6	0.64	1.6	5.44	0.96	10.24		
<u>3</u>	1.18	1.97	0.79	1.97	8.84	1.56	16.31		
<u>4</u>	0.77	1.21	0.48	1.21	5.44	0.96	10.07		
<u>5</u>	0.27	0.45	0.18	0.45	2.04	0.36	3.75		
totals	2.22	5.23	2.09	5.23	21.76	3.84	42.77		
	Observed numbers of Lithic Tools: Activity Area D								
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>totals</u>
<u>1</u>	0	1	1	1	0	3	1	4	11
<u>2</u>	1	1	6	0	1	2	0		11
<u>3</u>			1	1	0	1	2		5
<u>4</u>		1	1	0	1	2	1		6
totals	1	3	9	2	2	8	4	4	33
	Expected numbers of Lithic Tools: Activity Area D								
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>totals</u>
<u>1</u>	0.34	0.69	3.09	0.69	0.69	2.75	1.38	1.38	11.01
<u>2</u>	0.34	0.69	3.09	0.69	0.69	2.75	1.38		9.63
<u>3</u>			1.41	0.31	0.31	1.25	0.63		3.91
<u>4</u>		0.31	1.41	0.31	0.31	1.25	0.63		4.22
totals	0.68	1.69	9	2	2	8	4.02	1.38	28.77
	ACTIVITY AREA C:				ACTIVITY AREA D:				
	CHITEST: 0.55				CHITEST: 0.32				
	TOOLS:				TOOLS:				
	MEAN 1.4				MEAN 1.23				
	STDEV 1.63				STDEV 1.34				
	V/M 1.16				V/M 1.09				
	SIGNIF 0.12				SIGNIF >.25				

Table 6. Chi squared Distributions, V/M Ratios, and Significance Tests
Activity Areas C and D

V. *Activities Carried Out at the Fisher Site as Inferred from Specific Tools and Tool Kits*

General

The assemblage of artifacts recovered from the Late Prehistoric component of the Fisher site indicates that numerous subsistence-related activities were carried out during the time it was occupied. The analysis focuses on four distinct activity areas: Activity Areas A, B, C, and D. The spatial extent, amount of associated refuse, and lack of evidence for structures indicates that these were outside activity areas.

Activities that tend to occur at temporary big-game bison processing sites include meat processing for consumption and storage, hide processing, the manufacture and maintenance of stone tools necessary for performing these activities, and the manufacture and maintenance of weapons (Hughes 1991:35, Stevenson 1985:65). Each of these activities can be identified in the archaeological record by the presence and patterning of specific types of material remains.

The presence of burned bone fragments indicates food processing and consumption activities (Hughes 1991:35). Material evidence for the manufacture of stone tools includes cores, preforms, blanks, projectile points, and other tools associated with concentrations of lithic debitage (Hughes 1991:43, Sassaman 1992:74, Yeager 1986:38), while resharpening activity is indicated by small resharpening flakes and small piles of lithic debitage (Yeager 1986:38).

Marrow extraction is indicated by the presence of long bone shaft fragments and splinters that are known to have a high marrow content in contextual association with anvil stones, hammer stones, scrapers, utilized flakes, and sometimes knives (Binford 1978:345 and 1983:157; Hughes 1991:38; Jodry and Stanford 1992:125; Todd and Rapson 1988b:313; Yeager 1986:40). Contemporary hunter-gatherers have been observed hitting bones with knives in order to access the marrow within them (Binford 1978:345). Although marrow was generally extracted from long bones, mandibles, vertebrae, and foot bones were processed when food was scarce (Hughes 1991:34).

Bone shaft fragments are commonly found close to hearths, as they were often heated in order to facilitate the breaking of the bone as well as to heat the marrow (Binford 1983:157; Jodry and Stanford 1992:125; Yeager 1986:40). After the marrow is consumed, the shaft fragments are generally tossed away from the hearth, while smaller fragments are dropped where consumption occurred, resulting in drop and toss zones around the hearth.

Material evidence for bone scraping includes utilized flakes and scrapers contextually associated with bone fragments, long bone shafts, anvil stones, and occasionally knives (Hughes 1991:39; Little Bear 1980:240; Rapson 1990:336). Meat-cutting is indicated by vertebral elements and long bone shafts associated with anvil stones and cutting tools (Hughes 1991:39 and 43; Yeager 1986:70).

Scrapers and utilized flakes, and sometimes knives, indicate hide-working activity (Hughes 1991:40 & 43; Little Bear 1980:233; Mason 1894:73-74; Schneider 1983:104). These tools were used to remove excess meat and hair as well as thin the hides (Hoebel

1978:66; Jodry and Stanford 1992:158; Niethammer 1977:113; Rapson 1990:336; Yeager 1986:57).

Material evidence for weapons manufacture and maintenance activities includes shaft abraders, which were used to smooth and straighten arrow shafts (O'Brien 1991:59; Spector 1983:89; Yeager 1986:53). One type of craft activity, bead-working, can be inferred from archaeological remains by the presence of bone beads (Little Bear 1980:245; Yeager 1986:54). Snake vertebrae are also known to have been modified into beads by prehistoric Plains peoples (Little Bear 1980:245).

Finally, cooking activity can be inferred from the presence of hearths that contain charcoal, and sometimes ash and pottery sherds (Yeager 1986:82). Consumption activity can be identified based on the presence of fire pits, as those typically found at bison processing sites are known to be directly associated with the preparation of meat (Frison 1991:340). Consumption can also be inferred when burned bone fragments are found within hearths (Hughes 1991:35).

Activity Area A

Activity Area A is an excavated area of 19m². The area consists of a hearth (Hearth A, Figure 12) which is surrounded by three large and two smaller concentrations of lithic debitage, three hammer stones, one anvil stone, a variety of stone tools, and bone fragments. The hearth is lined with nine large rocks spaced close together with small gaps in the lining on the north and south sides, and was probably used to prepare meat (see Gero 1991:184). The hearth may have been used repeatedly, as a large concentration of

bone fragments and some flakes appear to have been dumped just outside the northern border of the hearth. Activities inferred from material remains in this area include stone tool manufacture, marrow extraction, meat-cutting, meat consumption, bone scraping, and hide-working.

Evidence for the manufacture of stone tools is abundant in one area, and resharpening of stone tools appears to have occurred in two areas. The manufacturing area is located in units N18 E12, N18 E13, N19 E12, and N19 E13 (Figure 16). Artifacts recovered from these units include one complete preform and three preform bases; one blank; four complete projectile points, two tips, and one base; eight biface fragments; and two utilized flakes. Resharpening activity is indicated in unit N17 E13 (Figure 16), where several obsidian flakes are present, and in units N16 E14 and N17 E14 (Figure 17), where three bifacial tools are each associated with small piles of lithic debitage.

Marrow extraction and meat cutting appear to have occurred in units N16 E14, N17 E14, N17 E15, N18 E14, N18 E15, N19 E14, and N19 E15 (Figure 17). Artifacts recovered from these units include three hammer stones, one anvil stone, and three bifacial tools. Small and large bone fragments are present, including bison humerus, radius, ulna, tibia, rib, scapula, atlas, acetabulum, metatarsal, calcaneous, astragalus, carpal, tarsal, phalanges, and caudal fragments, as well as a four articulated lumbar vertebrae, three cervical vertebrae, a fetal maxilla and teeth. A deer mandible is also present.

Material evidence indicating meat cutting, bone scraping, and hide-working activities is present in units N18 E11, N18 E12, N19 E11, and N19 E12 (Figure 16). Artifacts associated with these units include a scraper, two utilized flakes, and a biface.

Identifiable bone elements in these units include femur, tibia, rib, metacarpal, carpal, tarsal, sesamoid, and lateral spine fragments. Bone scraping and/or hide-working activity also appears to have occurred in units N15 E12 and N16 E12, and N16 E13. Artifacts recovered from these units include two bifacial tools and a scraper. Several long bone shaft fragments and numerous minute bone fragments are present as well.

Nine bone beads were recovered from four units. Three from N19 E11 and N19 E13, two from N18 E13, and one from N17 E13. Although no drilling tools were recovered from these units, one was recovered from the site, and it is possible that an individual shaped the shaft fragments during the time the site was occupied. Two bird bone shafts were recovered elsewhere at the site, as well as an articulated snake skeleton. One or more individuals may have engaged in bead-making activity during their spare time, or children may have performed the activity while their parents worked at other tasks.

If all four activity areas were occupied simultaneously, then spatial patterning and contextual association of material remains in Activity Area A indicate that six or more individuals participated in a variety of tasks relating to the processing of bison meat and hides, and manufactured and resharpened the stone tools necessary to carry out these and other tasks. Individuals sat north, east, and south of the hearth manufacturing stone tools and consuming bison meat, while individuals further east, northeast, southeast, and northwest of the hearth engaged in marrow extraction, meat cutting, bone-scraping, and hide-working activities.

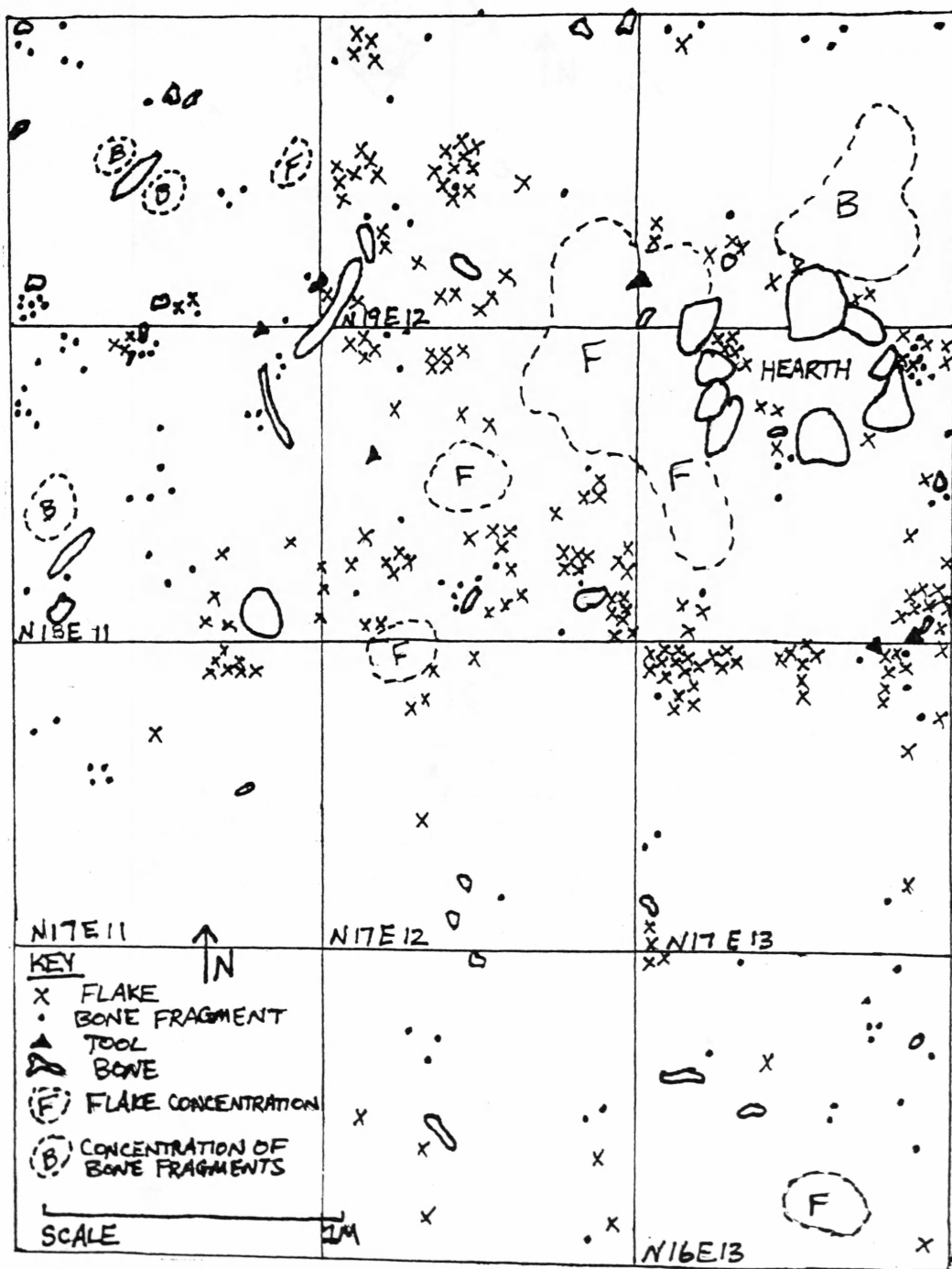


Figure 16. Activity Area A: Hearth, stone tool manufacturing, and hide-working areas

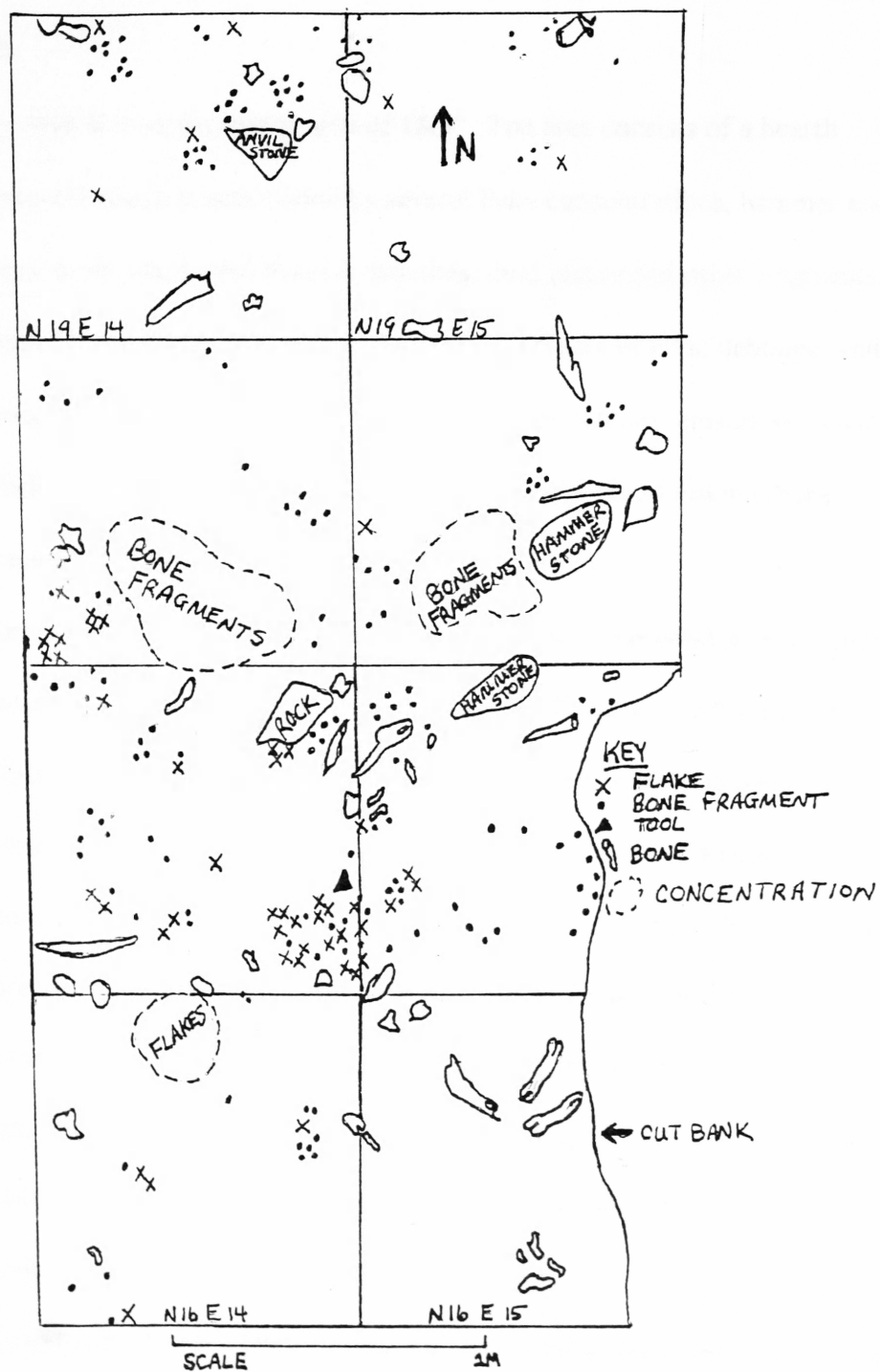


Figure 17. Activity Area A: Stone tool reshaping & bone processing areas

Activity Area B

Activity Area B is an excavated area of 18m². The area consists of a hearth (Hearth B, Figure 13) which is surrounded by several flake concentrations, hammer and anvil stones, stone tools, and faunal remains including shaft pieces and other fragments. The hearth is lined with six large stones, contains a small amount of lithic debitage, and was probably used to prepare meat. Activities inferred from material remains associated with this area include stone tool manufacture and resharpening, hide-working, bone cutting and scraping, marrow extraction, and meat consumption.

Two distinct areas of stone tool manufacturing activity are present in this activity area. One is located in N20 E18 and N20 E19 (Figure 18). Stone tools in this location include four bifaces, three whole and one partial projectile point, a preform base, two utilized flakes, and two scrapers. The tools are within or just outside of a large pile of flakes. The second location of stone tool manufacturing activity is in units N22 E18 and N22 E19 (Figure 18). Tools recovered from these units include three whole projectile points and one point tip, one preform base, one side scraper, one knife, and one core. As in the units above, all tools are located on the edge or just outside of a large pile of flakes.

Resharpening activity is indicated by the presence of several pieces of lithic debitage in association with a utilized flake in the bone bed in N20 E20 (Figure 18). Several individuals appear to have been making and resharpening the stone tools necessary to carry out the other activities which apparently occurred in this area.

Hide-working activity is suggested by the presence of a side scraper and a utilized flake, the major components of a tanning kit (Hoebel 1978:66; Jodry and Stanford

1992:158; Niethammer 1977:113), in N20 E18 and N20 E19. The presence of a side scraper and a knife in N22 E18 and N22 E19 indicate hide-working activity in addition to the stone tool manufacturing activity described above.

Bone cutting, scraping, and marrow extraction activities appear to have occurred at two locations within Activity Area B. One area includes units N20 E17, N21 E17, and N21 E18 (Figure 18). Ground stone and lithic artifacts in these units include an anvil stone with a utilized flake found at its base, two bifaces, and two scrapers. The anvil stone is surrounded by a concentration of tiny bone fragments and splinters, while humerus, radius, tibia, other long bone shaft segments, and some rib fragments are located on the periphery of and beyond the concentration of smaller bone fragments, which suggests they were tossed away from the central working area after they were processed. The bifaces were probably used to cut meat and crack bones to draw out marrow, while the scrapers and utilized flake may have been used to scrape the bones and possibly hides.

Material remains associated with the other bone-working area indicate that marrow extraction was the main activity, although meat consumption and bone scraping may also have occurred. This activity set is located in units N21 E20, N22 E20, N23 E20, and N23 E21 (Figure 18), and is associated with the hearth. Ground stone and chipped stone artifacts in these units include four anvil stones, a knife, a scraper, and a utilized flake. Each anvil stone is immediately surrounded by tiny bone fragments and splinters, while most of the larger segments of bone are located at a greater distance from the anvil stones. The specific

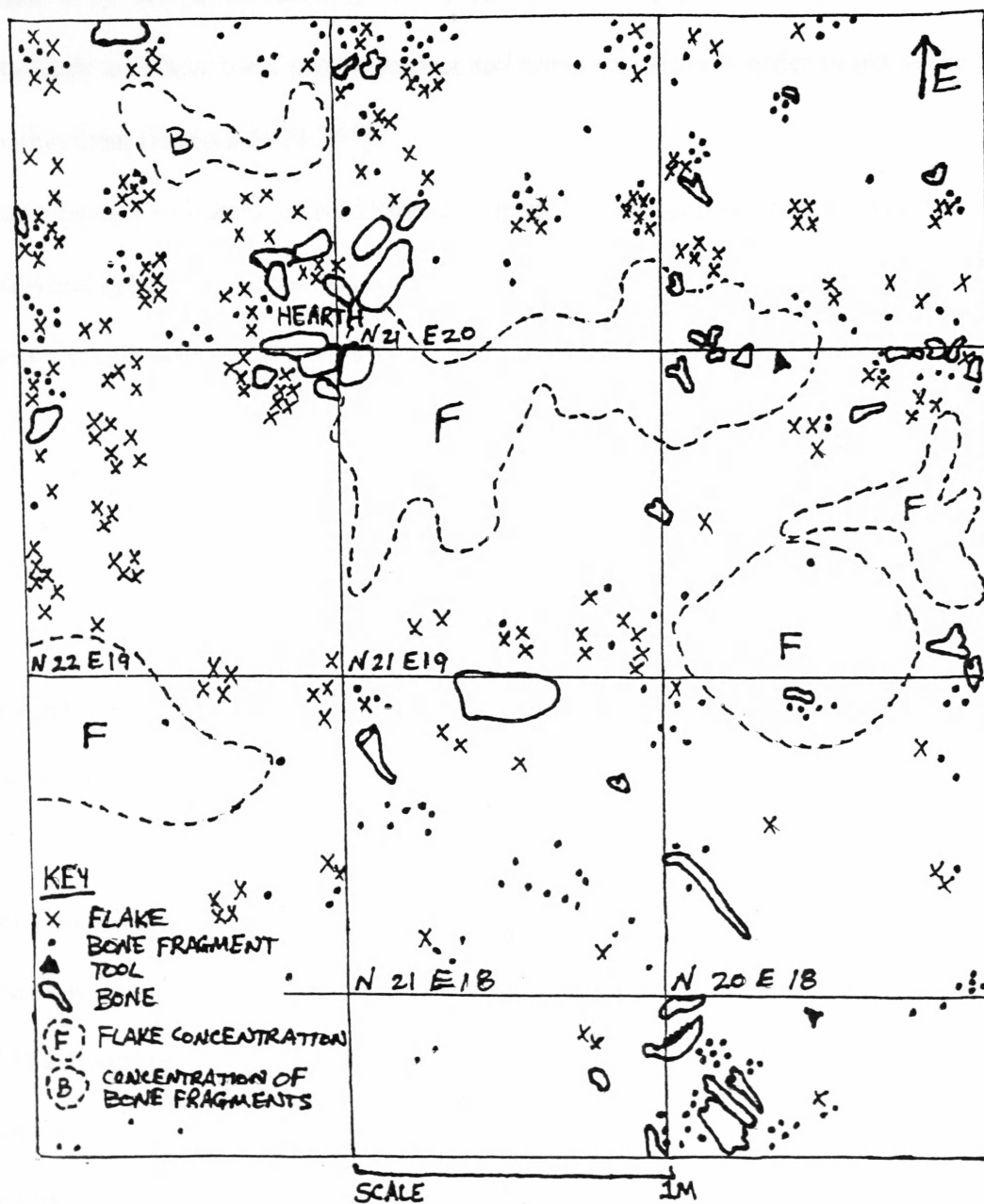


Figure 18. Activity Area B: Hearth, stone tool manufacturing and resharpening, and bone processing activities.

bones present in the area are bison femur, tibia, radius, ulna, scapula, ribs, and some foot bones. The knife may have been used to impact and break the bones in order to get at the marrow within them (Binford 1978:345).

Consumption activity is inferred from the patterning of faunal remains around the hearth. Ribs and other large bones are located at least 1.5m from the hearth and are likely to represent what Binford terms a “toss zone,” while smaller fragments of bone exist closer to the hearth and are likely to represent what Binford terms a “drop zone” (Binford 1978:345; and 1983:153).

The amount and types of material remains present in Activity Area B suggest that three individuals sat around the hearth extracting marrow and processing bison meat, bones, and hides, and cooking and consuming bison meat while at least two other individuals sat west of the hearth making and reworking stone tools.

Activity Area C

Activity Area C encompasses an area of 25m² and consists of a hearth (Hearth C, Figure 14) surrounded by one large and several smaller flake concentrations, two concentrations of bone fragments, one anvil stone bordered by lithic debitage, three anvil stones surrounded by bone fragments and shaft segments, four hammer stones, and a core. The hearth is lined by ten closely spaced stones on all but the western side, and appears to have been cleaned out at least once, as there is a concentration of extremely small burned bone fragments, tiny flakes, and pottery sherds outside its northern boundary. Material remains in this activity area indicate that stone tool manufacture and resharpening, bone

scraping, marrow extraction, meat consumption, hide-working, and weapons manufacture or maintenance activities occurred.

Evidence for the manufacture of stone tools exists in units N23 E13, N23 E14, and N24 E13 (Figure 19). Artifacts recovered from these units include three whole projectile points and one point tip; three whole preforms and one preform tip; and an anvil stone with a concentration of lithic debitage surrounding its base. The tools are located within and peripheral to a large concentration of lithic debitage. The anvil stone was probably used as a platform to rest a quartzite nodule on to reduce it into workable bipolar flakes. Stone tool manufacturing activity is also indicated in unit N23 E15 (Figure 19), which is part of a bone-processing activity set discussed below, where two preforms and a concentration of lithic debitage exist. A core surrounded by a flake pile and a hammer stone is located just northeast of the preforms, and several other tools are present in the area.

Resharpener activity is present in units N22 E12 and N23 E12, where two utilized flakes were found in association with several pieces of lithic debitage. Two end scrapers are also present, each surrounded by a pile of flakes. Other resharpener activity is associated within a bone processing area and is presented with that material.

Bone cutting, scraping, and marrow extraction appears to have occurred at two locations within Activity Area C. One area includes units N21 E12, N21 E13, and N21 E14, where one complete knife and one knife base were found within concentrations of small bone fragments. Shaft and other large bone parts occur as well; however, most lie outside of the concentrations of smaller fragments. Bison elements associated with this

activity set include femur, tibia, radius, ulna, rib, scapula, mandible, tarsal, and unidentifiable long bone fragments. The contextual association of these material remains indicate that two or more individuals were engaged in secondary butchering of bison as well as marrow extraction.

The other location of bone processing activity within Activity Area C is relatively large, and includes units N22 E16, N23 E15, N23 E16, N24 E15, and N24 E16 (Figure 19). Material remains in these units consist of two anvil stones, two hammer stones, two knives, two utilized flakes, six bifacial tools, and four scrapers. Some of the bifacial tools are broken, and one is located near a small pile of debitage, indicating that the individual using the tool resharpened it. These artifacts are associated with three distinct concentrations of small bone fragments and splinters, as well as a number of larger bone segments. Bone elements recovered include multiple humerus, tibia, femur, ulna, rib, phalange, and vertebral fragments, and one hyoid bone. One of the ribs is burned. These material remains suggest that several individuals sat west of the hearth and cut meat, scraped bone, extracted marrow, manufactured and resharpened the tools necessary to carry out their tasks, and ate meat.

Hide-working activity is present in at least two locations within Activity Area C. One area includes units N22 E12, N23 E11, N23 E12, and N23 E13, which contain three end scrapers and two utilized flakes. These tools are known ethnographically to be part of a tanning kit (Hoebel 1978:66; Jodry and Stanford 1992:158; Niethammer 1977:113). The other location at which hide-working activity may have occurred is in units N22 E15 and N23 E15 (Figure 19), where two side scrapers and two end scrapers were found.

Evidence for weapons manufacture and/or maintenance exists in units N22 E14 and N22 E15. One complete shaft abrader and the fragmentary remains of another were recovered from these units. It appears that one or more individuals sat on the south side of the hearth smoothing shafts.

Several pottery sherds were found inside of and surrounding the hearth, suggesting that the pots were used as cooking vessels. The sherds that have been refitted indicate two types of vessels: flat-bottomed and round-bottomed. Vessels with round bottoms were used for cooking over direct heat, while flat-bottomed vessels were used for indirect-heat cooking (Sassaman 1992:73). Although these vessel types have been associated with different cultural groups, their use in the same area indicates cooperating groups or functional differentiation.

An articulated snake skeleton and a pocket of red ochre were found in unit N21 E12. Plains peoples have been documented using snake vertebrae to make bone beads. It is possible that someone intended to convert the snake vertebrae into beads and paint them red, however, because the skeleton was recovered fully articulated, it seems that the site was abandoned before this activity could be performed. It is also possible that the snake skeleton is of no archaeological significance, as it could have died there after the site was abandoned.

Spatial patterning of artifacts and faunal remains suggests that three individuals sat on the southern, eastern, and western sides of the hearth, while other individuals sat northeast and west of the hearth performing tool and weapons manufacturing and maintenance as well as bone and hide-working activities. One individual sat northwest of

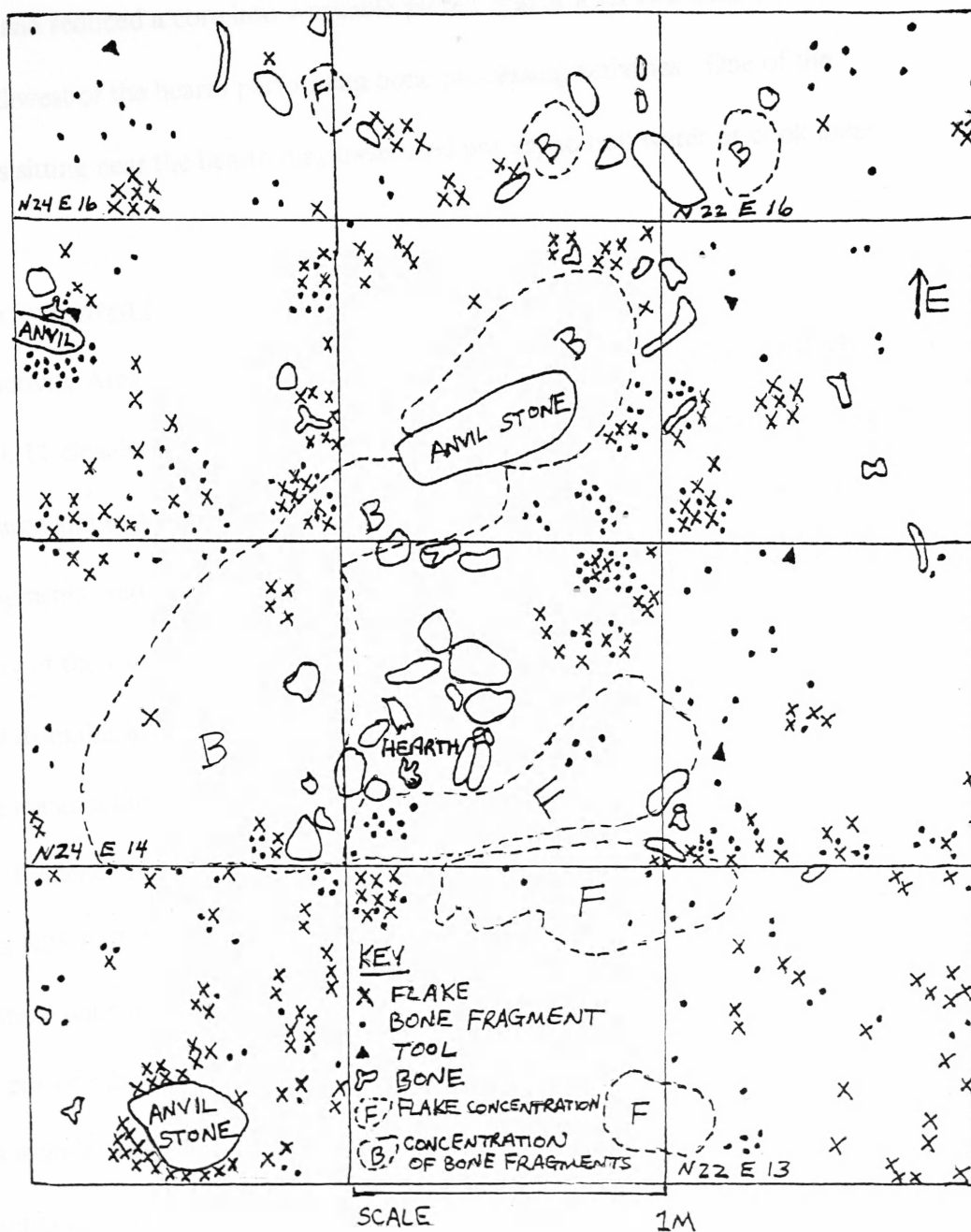


Figure 19. Activity Area C: Hearth, stone tool manufacturing, bone processing, and weapons maintenance activities

the hearth and reduced a core into workable pieces, and at least two others sat far south/southwest of the hearth performing bone processing activities. One of the individuals sitting near the hearth may have used pottery to boil water or cook meat.

Activity Area D

Activity Area D encompasses an area of 26 m² and consists of a hearth (Hearth D) lined with 11 closely spaced stones on all but the eastern side. The hearth is surrounded by one large and eight smaller flake concentrations, six anvil stones, hundreds of small bone fragments, and numerous more complete bones. Larger bone fragments occur on the periphery of the working area, while the smaller ones are more centralized. The activities inferred from this area include a variety of secondary butchering and bone-working tasks and the manufacture and modification of stone tools.

Evidence for the manufacture of stone tools is present in five distinct areas. One is in units N25 E17, N25 E18, N26 E17, and N26 E18 (Figure 21). Artifacts recovered from these units include a projectile point and a utilized flake in association with a core and a pile of lithic debitage. The second area where evidence of stone tool manufacturing exists includes units N26 E19, N27 E19, N28 E19, and N29 E19 (Figure 20). Artifacts recovered from these units include three whole projectile points and one point tip, two preforms, two bifaces, one scraper, and one utilized flake. The tools are located within and outside of a huge flake concentration west of the hearth.

The third area where stone tool manufacture seems to have occurred is in unit N27

E22 (Figure 20). Artifacts recovered from this location include one projectile point, one whole preform, one preform base, one whole biface, and two partial bifaces. The artifacts are located in a large pile of flakes on the edge of a concentration of bone fragments. The fourth location of tool manufacturing activity is in unit N26 E23 (Figure 22), where a projectile point and a preform were found associated with a flake pile. The last area of inferred stone tool manufacturing activity is in unit N28 E24, where one preform base, and one projectile point midsection and tip were recovered from a flake pile.

Material remains in Activity Area D indicate that stone tool maintenance activity occurred at four distinct locations. In N25 E18 (Figure 22) a small flake pile associated with a utilized flake indicates that the tool was resharpened, probably during bone or hide-scraping. In N25 E19 (Figure 21) a scraper surrounded by several pieces of debitage suggests that the tool was resharpened during bone or hide-scraping activity. In N25 E21 and N25 E22 (Figure 22), an end scraper and knife tip associated with small flake piles indicate resharpening during bone or hide-scraping and meat cutting activities. Finally, in N28 E18 (Figure 21), one complete and two partial bifaces contextually associated with a concentration of lithic debitage indicates resharpening of these tools during bone scraping and consumption activities.

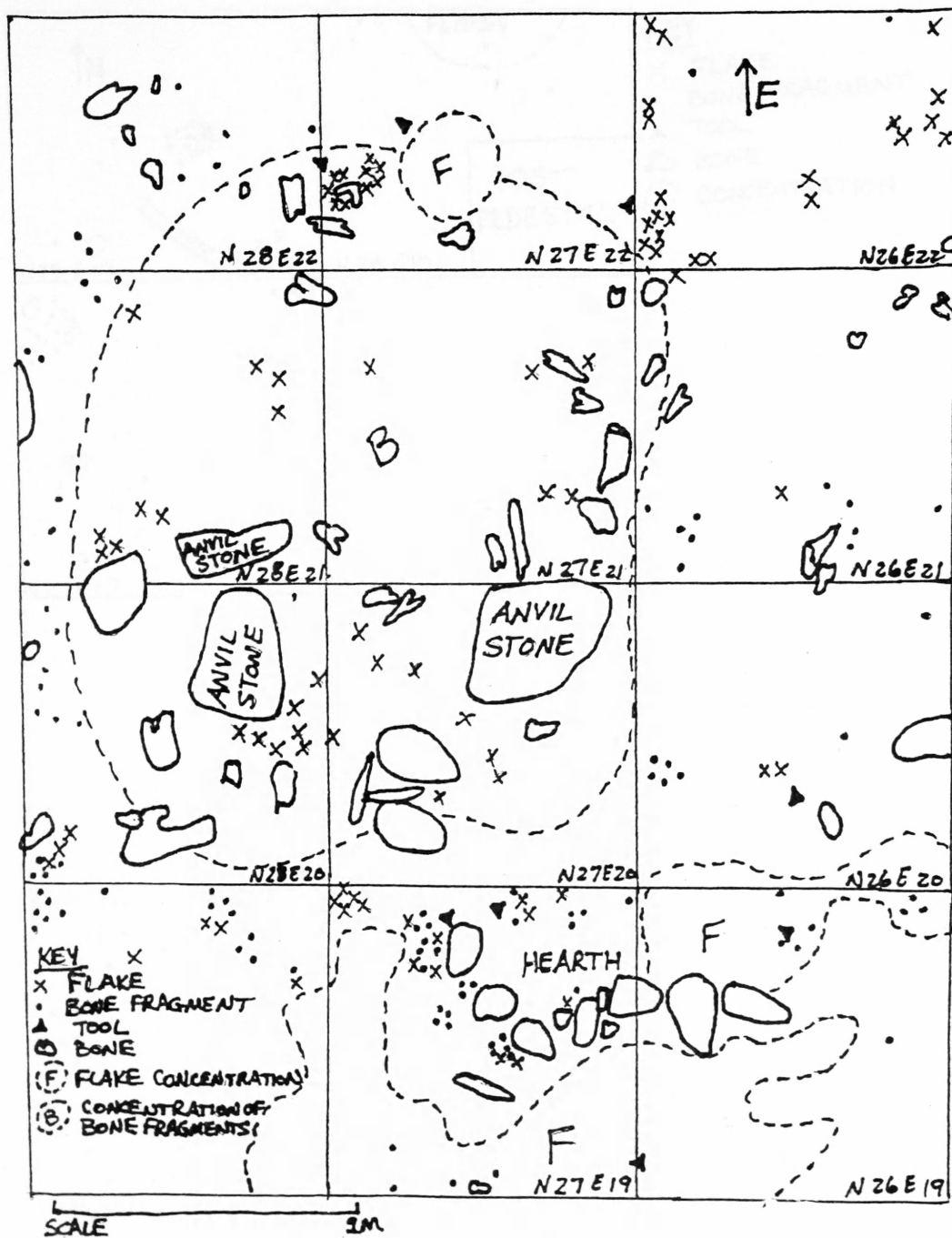
Marrow extraction and other bone working activities appear to have occurred in three distinct locations. Units N25 E21 and N25 E22 (Figure 22) contain artifacts indicative of marrow extraction, meat cutting, bone scraping, and hide-working activity. Artifacts recovered from these units include an end scraper, a knife, a projectile point, and an anvil stone. The artifacts are associated with a concentration of small bone fragments,

and larger bone segments are present as well. Identifiable bison elements recovered from these units include humerus, radius, ulna, tibia, rib, patella, and lumbar vertebral fragments.

Marrow extraction and bone scraping also seem to have occurred in units N25 E17, N25 E18, and N25 E19 (Figure 21). Artifacts recovered from these units include a scraper, a utilized flake, and two anvil stones. The stone tools appear to have been resharpened during use, as each is contextually associated with a small pile of lithic debitage. The artifacts were found among numerous bison bone fragments, including radius, ulna, tibia, rib, metatarsal, metacarpal, and phalange fragments, as well as numerous unidentifiable fragments.

Marrow extraction, meat cutting, and meat consumption activities are inferred from material remains in units N27 E20, N27 E21, N27 E22, N28 E20, N28 E21 and N28 E22 (Figure 20). Artifacts recovered from these units include four anvil stones, a knife, and another bifacial tool. The anvil stones are surrounded by hundreds of unidentifiable bone fragments, however, several identifiable fragments are also present. These include femur, tibia, ulna, humerus, radius, rib, scapula, pelvis, dorsal spine, metatarsal, tarsal, carpal, calcaneous, and phalange fragments.

Spatial patterning and contextual association of material remains in Activity Area D indicate that individuals sat working far west of the hearth scraping bones and resharpening their tools when necessary; southwest of the hearth extracting marrow, scraping bones, and hide-working; south of the hearth involved in tool manufacture; east and northeast of the hearth engaged in marrow extraction; and further east of the hearth



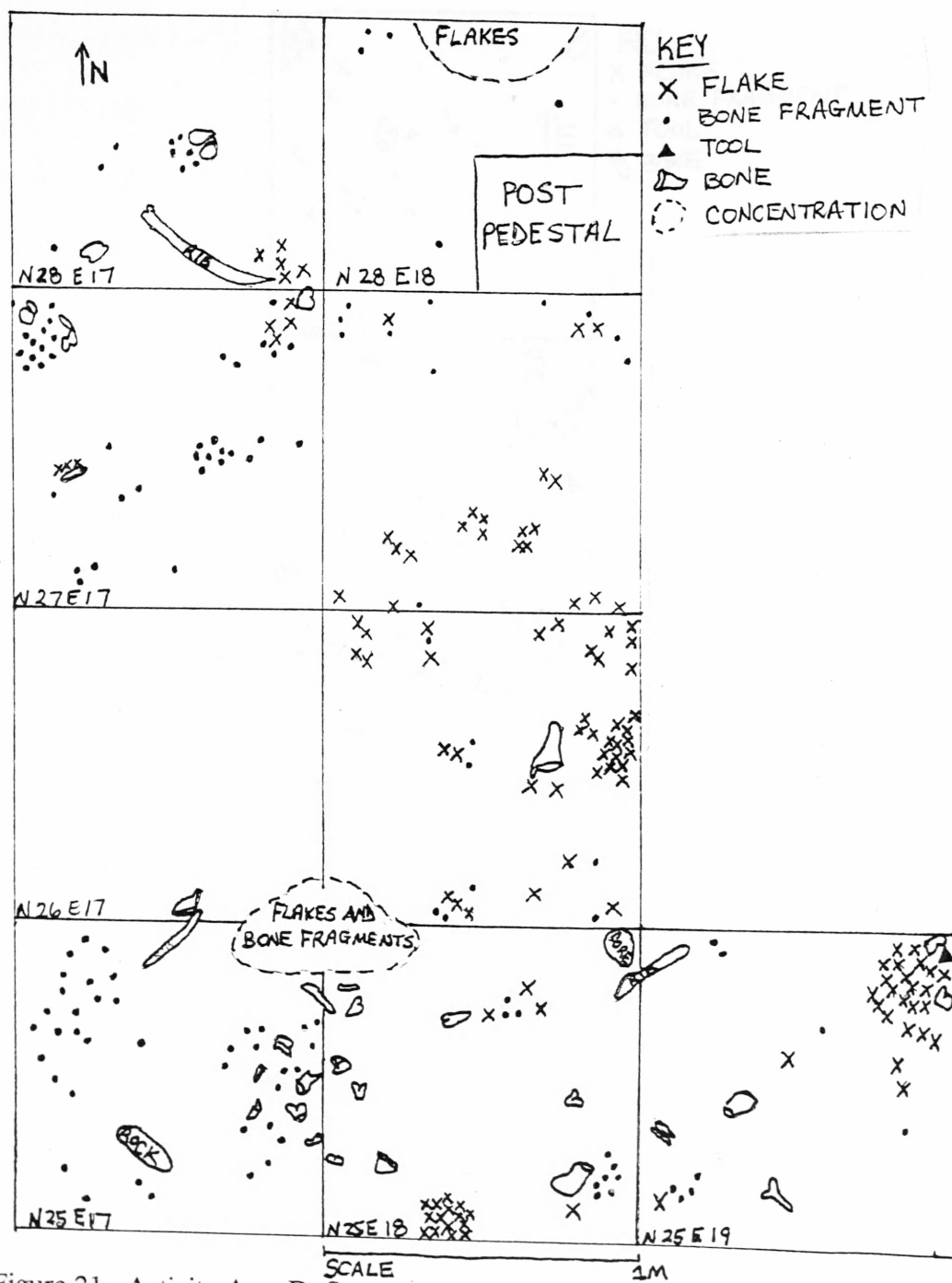


Figure 21. Activity Area D: Stone tool manufacturing and resharpening; and bone processing activities

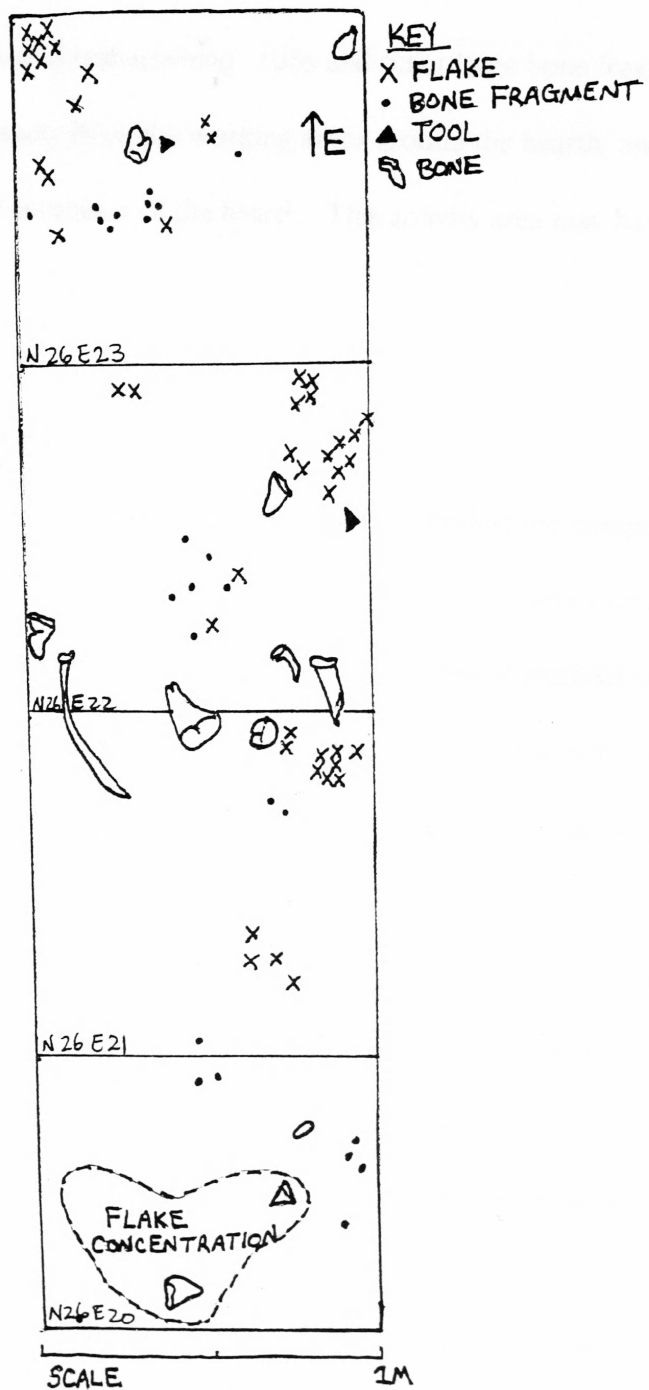


Figure 22. Activity Area D: Stone tool manufacturing and resharpening; and bone processing activities.

involved in tool manufacture and resharpening. Ribs and other large bone fragments appear to have been tossed away from the working areas around the hearth, and resulted in toss zones east, west, and southeast of the hearth. This activity area may have involved up to ten individuals.

Conclusions to Activity Area Analysis

In sum, the assemblage of artifacts present in the Late Prehistoric component of the Fisher site indicates that a variety of subsistence-related activities were carried out. Several activities can be inferred based on the patterning and types of material remains present, including preparation of meat for immediate consumption and possibly storage; the manufacturing and maintenance of stone tools used for meat processing, bone working and processing, hide-working, and weapons; and craft activities.

The activity areas include multiple complexes of anvil stones and hearths, which probably required the cooperative effort of several individuals to fabricate, maintain, and use (see Reher 1977:33). All of the activity areas analyzed are multi-functional, and none of the activities identified appear to have been restricted to special use areas, as marrow-extraction, tool manufacture, hide-working, bone scraping, weapons manufacture and maintenance, and craft activities occurred at several different locations within each activity area. All hammer stones and all but one anvil stone were recovered from areas where large-scale bone processing activities appear to have occurred with minimal clean-up afterward. These activities created a large amount of refuse that seems to be in primary context, as small bone fragments are contextually associated with large ones.

In general the clusters of artifacts recovered from activity areas in the Late Prehistoric component of the Fisher site are alike in terms of the types of tools and refuse present, and suggest that the site was probably occupied just long enough to process bison meat and hides, restore and replace hunting equipment, and possibly dry some meat for storage.

VI. Archaeology and Gender Theory

While practitioners of the other social sciences are equipped with tangible men and women to work with and derive gender theory from, archaeologists must base the identification of items and activities associated with particular genders on relatively obscure data (Wylie 1991:31). As a result, some archaeologists believe that questions concerning gender can not be pursued archaeologically until theory or methods capable of elucidating gender in the archaeological record is developed in fields that have access to extant men and women (Wylie 1991:31).

The difficulties with the lack of methodology for the archaeological study of gender include the assumption that archaeologists need to wait for theory and methods that can be applied to the archaeological study of gender to develop before such study can be undertaken (Wylie 1991:32-33). If this were true, there would be no gender research in archaeology until appropriate theory and methods were available (Wylie 1991:33).

According to Spector and Whelan:

A central concern in the archaeology of gender is determining which aspects of gender are expressed materially and spatially at the sites people in the past created and used. All archaeologists assume there are “knowable” correlations between specific material things and spaces on the one hand, and particular activities, behaviors, and beliefs on the other... We assume that information about gender *is* encoded or reflected in the material remains and their spatial arrangements preserved at sites, but we need new concepts and methods to help us decode site materials in terms of gender (1989:6).

Research concerning gender roles in past activities is possible so long as archaeologists do not assume to know the types of gender relations that existed in

particular archaeological remains or if gender was even a significant category applicable to the group who created the remains (Spector and Whelan 1989:78).

An approach which has been used to identify gender in the archaeological record is Janet Spector's task differentiation approach (Spector 1983), and is employed in inferring gender from activity areas at the Fisher site. Spector studied Eastern Dakota (Whapeton) peoples in Minnesota and the Hidatsa Indians of the Great Plains (Spector 1983:77) in hopes of finding a way to learn about gender from activity patterns in the archaeological record, i.e., to identify the physical dimensions of gender systems present in material remains (Spector 1991:389), and to determine the extent to which it is possible to obtain information about gender from the archaeological record (Spector 1983:77).

The basis of the task differentiation framework is the analysis of activities, concentrating on "...the organization of males and females in the execution of tasks and the spatial, temporal, and material dimensions of those tasks" (Spector 1983:78). The focus on analysis of activities will help determine whether gender can be inferred from material remains. According to Spector, "...it seems logical to assume that the structure of archaeological sites...is related to the kinds of activities engaged in by a given population within a particular environmental setting" (1983:79). Spector defines a task as:

a segment of activity which has discrete parameters in terms of the social unit of task performance, that is, the segment of the population engaged in the task; the season, frequency, and duration of the task; the location of task performance; and the material--artifacts, structures and facilities--associated with the execution of the task (1983:82).

In order to interpret task differentiation it is important to know the season(s) during which the site was occupied, and to chart these parameters: the number of people involved in each task, including relationships between and among activities, proximity, and temporal organization in order to understand how people involved in each task interact; the frequency and duration of each activity (which can be looked at at the seasonal level), to highlight relationships between activities and the people performing them as well as the demands such relationships might place on the need for and use of specific implements; the location where activities were carried out (spatial dimensions), to differentiate between multi- and mono-functional areas; and the artifacts and features associated with the performance of individual activities, including linkages among individuals performing activities and how implements are used and shared (Spector 1983:91-93). The framework provides for fluid and changing structures of division of labor among humans (1984:25), highlights relationships between activities and dimensions of task differentiation (Spector 1983:91), and should provide information that will allow archaeologists to make generalizations and comparisons about the activity patterns of women and men (1989:76).

In addition to directly studying these groups, Spector looked to the historical and ethnographic records for documentation regarding the material dimensions of gender specific activities, beliefs, and behaviors as a means of identifying material consistencies in various activity systems which might be visible in the archaeological record (1991:390-391). Although the task differentiation framework proved useful in identifying gender-related activities in the archaeological record and illustrated several differences in the lives of men and women, Spector became displeased with the task differentiation framework

because it did not provide her with a means of presenting her findings concerning the peoples she worked with (Spector 1991:395 and 404). Although Spector was dissatisfied with the approach, the fact that it proved useful in identifying gender in the archaeological record makes it an appropriate approach to use for this analysis.

Alternative sex roles for Plains Indian men and women

In her article Questioning Gender, Cheryl Classen proposes that there is no way to determine the number of different genders that existed in past societies through examinations of material remains, spatial analyses, or contextual associations in the archaeological record (Classen 1992:3). Furthermore, although archaeologists have associated particular artifacts with people of different ages and sexes, we lack an understanding of how *gender* as a category of identity is reflected in the material remains of different peoples, and have not discovered a means by which to identify gender in addition to sex and sex roles (Classen 1992:3). A major problem for archaeologists who wish to identify gender from material culture is: “the probable assumption that two genders have always characterized human history” (Classen 1992:4).

According to Callender and Kochems (1983:443, 445), berdache were males who wore female clothing, engaged in female activities and behavior, were recognized by most Plains groups, and should be treated as a distinct gender. Berdache were skilled in the arts of cooking, sewing, gathering, and craftsmanship, and generally refrained from engaging in warfare (Callender and Kochems 1983:447-448). Berdache excelled in crafts generally

practiced by women, were believed to have unusual power (Schneider 1983:116) and, according to Callender and Kochems:

The intermediate nature of their gender status allowed them to combine activities proper to men and women, and maximize their economic opportunities (1983:448).

Although berdache engaged in behaviors and activities associated with women in Plains Indian societies, they often remained involved in male activities (Medicine 1983:268). For this reason, the material culture of berdache individuals can not be distinguished from that generally assigned to women or men (Classen 1992:3; Hayden 1992:34).

While a man's competence in women's activities was rarely questioned, women were rarely involved in men's activities due to their supposed lack of physical strength, intelligence, or coordination (Niethammer 1977:133), however, one alternative role that Plains Indian women could assume was that of *warrior women* (Medicine 1983:267). Niethammer notes that some Eastern Sioux women rode in war parties and participated in hunting activities generally carried out exclusively by males, and states that "women who established themselves as strong enough to hold their own in the male sphere earned higher reputations" (Niethammer 1977:133-134).

Although it is important to note that berdache and warrior women are arguably third and fourth genders in Plains Indian societies, because material remains left by these individuals are indistinguishable from those typically linked to women or men, the assignment of gender to material remains within activity areas at the Fisher site will be limited to two genders: male and female

VII. *Ethnographic and Ethnoarchaeological Evidence for Gender Roles in Specific Activities*

General

Many archaeologists have carried out ethnoarchaeological analyses in order to answer questions about social organization and behavior (see Binford 1978 and 1980; and Yellen 1977a and b for examples). When archaeologists wish to identify gender behavior in the archaeological record, it is important that they study contemporary hunter-gatherers characterized by adaptational problems that mirror those faced by the particular prehistoric society being investigated (Hayden 1992:34). The use of comparative ethnographies can also help archaeologists infer past gender roles from material remains (Hayden 1992:34). Some generalizations which have come forth as a result of cross-cultural studies of contemporary hunter-gatherers include the following: males hunt, engage in warfare, and make portable tools, such as bifaces and hand axes; females cook, gather, care for infants, scrape and prepare hides, and grind foods (Hayden 1992:35).

While some types of behavior appear to be nearly universal, many aspects of gender behavior are variable, and just because a female performs a task in one society does not mean that females of all societies will perform that task (Hayden 1992:37; Medicine 1978:16 and 1983:267). Although productive labor symbolically reflected gender among Plains societies, both males and females could participate in activities usually performed exclusively by one or the other when necessary (Albers 1989:136). According to Schneider:

The division of labor between men and women was not only not exclusive, but the kinds of duties which were considered appropriate for men and women varied from group to group. It is not possible to assume that because a task was done by women in one group that it was done by women in all groups (1983:118).

On the other hand, ethnographic sources indicate that in some societies there is indeed a strong tendency to differentiate economic tasks on the basis of sex. For instance, among the Lakota Sioux, gender differences are accentuated in almost all aspects of life, and are characterized by differences in behavior (DeMallie 1983:238). The division of labor by sex was strict, and behavior was the most important parameter that differentiated female from male (DeMallie 1983:238).

Stone Tool Manufacture

While it was once thought that only males were involved in the manufacture of stone tools, ethnoarchaeological and ethnographic information confirm that women made tools as well (Gero 1991:175; Goodale 1971:155; Hayden 1977:185; Holmes 1919:316; Little Bear 1980:249). When women worked at base camps, they needed tools in order to carry out their tasks, and probably did not rely upon men to make tools for them (Gero 1991:170). The tasks carried out by women required tools with sharp working edges, and were probably frequently resharpened by the women who used them (Gero 1991:170).

Men produced tools for hunting weaponry, particularly projectile points and knives (Binford 1983:152; Hughes 1991:35, Mason 1894:140), while women made tools used in food preparation, bone working, hide processing, and other domestic activities (Bonvillian 1989:20; Holmes 1991:316; Mason 1894:27 and 140). Although males usually had

control over non-local lithic raw materials, women obviously had access to locally available lithic materials (Gould 1977:164).

Although archaeologists have been able to highlight the kinds of evidence that are likely to reflect gender behavior that occurred in the past (Demallie 1983; Gero 1991; Hayden 1992; Murdock 1937:533; Spector 1983 and 1991), interpreting gender from some types of material remains can be problematic. According to Hayden,

...occasional arrowheads made by females cannot be distinguished from those made, used, or abandoned by males; nor would a few female manufactured arrowheads significantly change any statistical inferences based on the much larger number of arrowheads made, used, and abandoned by males (Hayden 1992:34).

Gero suggests that in order to assign gender to the producer of a specific tool, it is necessary to examine lithic assemblages that a) are found in habitation areas where domestic tasks occurred repeatedly, b) are made of locally-obtainable raw materials, and c) include flake tools (Gero 1991:176). The assemblage of stone tools at the Fisher site meets all three criterion, and therefore has potential for being linked to gender.

Marrow extraction, secondary butchering, and bone scraping

Both men and women have been observed engaging in marrow extraction, although among Plains societies, women are documented as engaging in this activity to a greater extent than men (Binford 1983:153; Burton et.al. 1977:250; Hughes 1991:35; Mason 1894:29). According to Lowie, women carried out *all* meat processing activities, including secondary butchering, bone scraping, drying, and storing meat (1982:67-68).

Hide-working

Among Plains societies, all hide-working activities were carried out by women (Bonvillain 1989:19-20; Hughes 1991:35; Little Bear 1980:232; Lowie 1982:80; Mason 1894:60; Medicine 1978:60; Murdock and Provost 1973:211; Niethammer 1977:111; Spector 1983:82-89). Scraping tools and flakes were used to scrape the excess meat, fat, and hair from hides, and therefore female hide-working activity can be inferred from the contextual association of these tools at archaeological sites (Little Bear 1980:232; Mason 1894:73-74).

Manufacture and maintenance of weapons

Activities involving the production and maintenance of weapons are associated exclusively with males (O'Connell, et.al. 1991:70). Both Plains and Nunamiut men have been observed abrading arrow shafts; therefore, when shaft abraders are present among material remains, a male activity area can be inferred (Binford 1978:334; Hoebel 1978:66; and 1983:153; O'Brien 1991:59).

Cooking and pottery

Although Plains women did almost all of the cooking in prehistory (Bonvillain 1989:20; Burton et.al. 1977:250; Hastorf 1991:134; Hoebel 1978:80; Hughes 1991:35; Little Bear 1980:184; 216; Mason 1894:14; Medicine 1978:60; Murdock and Provost 1973:211), men may have occasionally cooked meat for immediate consumption while engaging in tool manufacturing and weapons maintenance around hearths (Binford

1978:334 and 1983:153). For this reason, gender can be inferred from cooking activity as either male or female, depending on the presence of other artifacts that are gender/activity-specific. Because women made and used the majority of pottery in small-scale societies (Mason 1894:91; Murdock and Provost 1973:219; Wright 1991:194), pottery and sherds among material remains, especially when associated with artifacts from other female activities, indicate a female activity area (Mason 1894:91; Sassaman 1992:74).

Conclusions

Ethnographic information concerning historic Northern Plains groups indicates that male and female activities are consistent within a specialized bison hunting economy (Hughes 1991:27; Table 7). Men hunt and manufacture tools used in hunting and warfare (Binford 1983:154; Hughes 1991:35; Mason 1894:140), while women perform domestic tasks and process meat and bones (Lowie 1982:67-68). As men worked they often ate rib segments and bone marrow, and disposed of bone fragments in drop and toss zones or into the hearth (Binford 1978:334 and 1983:153). Based on these facts, hearths surrounded by extensive lithic debitage from projectile points, knives, and other tools associated with hunting should indicate male activity areas. Because the Fisher site was occupied by Plains bison hunting groups who may have been characterized by an adaptive strategy similar to later bison hunting groups, ethnographic and historical data on Plains societies is appropriate to use in the assignment of gender to activities that occurred at the Fisher site.

CULTURAL GROUP	Prepare Food	Hunt	Tan Hides	Process Meat	Make Tools for Personal Tasks
Assiniboine Kennedy 1961	Female	Male	Female	Female	Female, Male
Blackfoot Ewers 1980, 1982; Hungrywolf 1982	Female	Male	Female	Female	Female, Male
Cree Mandelbaum. 1985	Female	Male	Female	Female	Female, Male
Cheyenne Grinnell 1972	Female	Male	Female	Female	Female, Male
Crow Lowie 1963	Female	Male	Female	Female	Male
Gros Ventre Flannery 1953	Female	Male	Female	Female	Female, Male
Hidatsa Spector 1983	Female	Male	Female	Female	---
Nunamiut Binford 1978a & b	Female	Male	Female	Female, Male*	Male
Pawnee O'Brien 1991	Female	Male	Female	Female	Female, Male
Teton Sioux (Lakota) DeMallie 1983	Female	Male	Female	Female	Female, Male
* = on occasion, — = data not available					

Table 7 Male and female tasks compiled from Historic Northern Plains Groups and the Alaskan Nunamiut

Northern Plains Indian women prepared food, processed meat and bones, extracted marrow, and worked hides, therefore, material evidence for these activities suggests female activity. Anvil stones, hearths, and tools used for marrow extraction, meat cutting, bone scraping, and hide-working are likely to be present. Resharpening flakes and an abundance of bone fragments should be present as well.

VIII. Gender roles in activities performed at the Fisher site

Assuming that male and female tasks among Plains and Nunamiut large-game hunting groups documented ethnographically and ethnoarchaeologically were similar in prehistory, it is possible to assign gender to sets of activities that occurred at the Fisher site. The pages that follow contain interpretations of male and female task differentiation from the material remains present in the four activity areas at the Fisher site discussed in Chapter six. Gender roles in the manufacture and maintenance of stone tools, marrow extraction and bone scraping, secondary butchering/meat cutting, hide-working, cooking, meat consumption, the manufacture and maintenance of weapons, and craft activities are discussed.

Stone Tool Manufacture

Evidence for the manufacture of stone tools is present in ten different locations within the four activity areas analyzed, and each is inferred as having been created by men due to the types of tools that were produced. In Activity Area A, the only stone tool manufacturing area is on the west side of the hearth (Figure 16). The majority of tools and tool fragments present are tools used as weapons, including projectile points and point preforms. In Activity Area B, stone tool manufacturing activity occurred in two different locations: northwest and southwest of the hearth (Figure 18). Most of the tools recovered from both locations are used for hunting, and include eight projectile points, multiple preforms, four bifacial tools and a knife. Stone tool manufacture also occurred at two

locations in Activity Area C: on the south and west sides of the hearth (Figure 19). The majority of tools recovered from both locations are tools used in conjunction with weapons, and include four projectile points and six preforms. Finally, in Activity Area D, stone tool manufacturing activity occurred in five different places. They are north, south, and southwest of the hearth (Figures 20, 21, and 22); and east and north of the bone processing area (Figure 20). In each of the five locations, the majority of stone tools present are used for hunting, and include ten projectile points and six point preforms.

Based on what is known about the manufacture of weapons-related stone tools from ethnographic and ethnoarchaeological accounts, it is inferred that males were responsible for the creation of tool manufacturing activity sets at the Fisher site. Extensive manufacturing of stone tools used as weapons is therefore a sex-specific activity. Most of the tool manufacturing activity occurred in close proximity to a hearth. The presence of stone tools used to scrape meat off bones and break bones to retrieve marrow (bifaces and utilized flakes), and the presence of bone fragments in drop and toss zones surrounding the hearths indicates that the men were consuming meat as they engaged in stone tool manufacturing activities. It is also important that bifaces and utilized flakes are not present in two of the three tool manufacturing areas set away from a hearth.

Stone tool resharpening

Resharpening activity is present at eight different locations within the four activity areas analyzed. Resharpening activity does not appear to be sex-specific, rather, it seems

that both men and women resharpened the stone tools that they were using as necessary. Four locations of stone tool resharpening activity have been inferred as resulting from male activity and four from female activity. Assignment of gender to resharpening activity was based on the type of tool that was resharpened as well as the context in which the resharpening flakes were found.

Tools appear to have been resharpened at two locations within Activity Area A. One is on the south side of the hearth (Figure 16), and consists of several obsidian flakes. This is interpreted as a male activity because obsidian is not local to the area, and it has been demonstrated that in hunter-gatherer societies, males typically had control over non-local lithic raw materials (Gould 1977:164). The other locality of resharpening activity within Activity Area A is southeast of the hearth (Figure 17), and contains three clusters of material remains indicative of resharpening activity. Because the resharpening occurred in a large secondary butchering and bone-processing area, it probably reflects a female activity.

A utilized flake in the bone bed in Activity Area B (Figure 18) appears to have been resharpened by a female who was scraping bones. Similarly, two utilized flakes found in Activity Area C (Figure 19) were resharpened by one or more women during bone scraping activities.

Stone tool resharpening occurred at four different localities within Activity Area D (Figures 20, 21, and 22). Three appear to be the result of male activity, as the debitage is located near tool manufacturing areas. Consumption activity appears to have occurred as well. The men probably resharpened the utilized flake, scraper, and biface fragments after

they became dull from scraping meat from bones and marrow extraction. The other location of resharpening activity is inferred to be the result of female activity. The tool that was resharpened was an end scraper, a tool which only women have been observed using (O'Brien 1991:59), and was situated in an area where other female activities, including secondary butchering and bone-processing, occurred (Figure 22).

Marrow extraction and bone scraping

Bone processing activities, including marrow extraction and bone scraping, occurred in at least six different locations within the four activity areas analyzed. Five are inferred as having been carried out by females due to their contextual association with artifact assemblages that result from female activities. The artifacts present include twelve anvil stones, five hammer stones, ten bifacial tools, five knives, six scrapers, and three utilized flakes. All are located in bone processing areas in association with distinct concentrations of small bone fragments and shaft segments.

In Activity Area A, marrow extraction and bone scraping occurred east and southeast of the hearth (Figure 17). Both small and large bone fragments are present, as well as three hammer stones, one anvil stone, and three bifacial tools that were resharpened as the work was being done. After scraping the meat and sinew off of the bones, one or more women apparently warmed the bones in the nearest hearth then broke them to retrieve marrow.

In Activity Area B, at least two women extracted marrow from bison bones west and south of the hearth (Figure 18). Artifacts recovered from this location include four

anvil stones, a knife, a scraper, and a utilized flake. All are surrounded by bone fragments. The knife was probably used to break the bones in order to access the marrow inside of them, while the scraper and utilized flake were employed to scrape excess meat and sinew off of the bones.

Marrow extraction occurred at two locations in Activity Area C: east and west of the hearth. In the location east of the hearth, two hammer stones, two anvil stones, two knives, two utilized flakes, and six bifacial tools were employed to extract marrow and scrape bones (Figure 19). Three distinct concentrations of bone fragments are present as well (Figure 19). These activities were probably carried out by two women, each with a hammer and anvil stone, a knife, a utilized flake, and several bifacial tools. The gender associated with marrow extraction activity west of the hearth is indeterminable, as the associated material remains (two knives and several bone fragments) could have resulted from either male or female activity.

In Activity Area D, marrow extraction and bone scraping activities occurred at three locations: southeast (Figure 22), northeast (Figure 20), and northwest (Figure 21) of the hearth. An anvil stone and a knife were recovered from one location (southeast of the hearth); two anvil stones, a scraper, and a utilized flake from a second location (southwest of the hearth); and four anvil stones, a knife, and a bifacial tool from a third location (northeast of the hearth). Two of the activity sets, the first and third, are inferred as having resulted female activities due to their association with a huge bone processing and meat cutting area, activities which are known to have been performed by females.

Similarly, the gender associated with the second location is identified as female because meat cutting and hide-working occurred at there as well.

Secondary Butchering

Meat cutting, bone scraping, and hide-working occurred west of the hearth in Activity Area A (Figure 16). This activity set indicates female activity. Artifacts recovered include a scraper, two utilized flakes, and a biface, tools which comprise a tanning kit. We know that women were responsible for secondary butchering and hide-working activities, therefore, it is inferred that a female carried out this set of activities at the Fisher site. Another female engaged in hide working activity south of the hearth (Figures 16 and 17), where two bifaces and a scraper were recovered. Meat cutting and hide-working activity is present in Activity Areas B, C, and D as well (Figures 18-22), and are inferred as resulting from female activities for the same reasons mentioned above.

Manufacture and maintenance of weapons

The presence of shaft abraders in Activity Area C indicates male activity for two reasons. First, only males are known to manufacture weaponry, and second, the shaft abraders were found on the south side of the hearth in close proximity to a stone tool manufacturing area that also resulted from male activity.

Crafts

Craft activities such as making bead-working and pottery-making and use are carried out by females (Mason 1894:91, Murdock & Provost 1973:219). Ethnographic

accounts confirm that women made and used the majority of pottery (Murdock & Provost 1973:219; Sassanian 1992:74), therefore, the presence of pottery sherds in and around the Hearth C indicates that women used that hearth.

The bone beads recovered from the Fisher site were located on the west, south, and north of Hearth A (Figure 16), where bone processing and tool manufacturing activity also occurred. The beads were probably made by an adult craft specialist or a child. Children often engaged in this type of activity while their parents worked at other tasks (Burton, et.al. 1977:228; Medicine 1978:41-44; Nerlove 1974:207). Unless the woman was a craft specialist, it is difficult to imagine that one woman was making beads while everyone else was processing bison products from the kill.

Hide-working

Hide-working occurred in all four activity areas analyzed, and is presumed to be the result of female activity. In Activity Area A, hide-working (as well as meat cutting) occurred west and south of the hearth (Figure 16). In Activity Area B, hide-working occurred north, south, and southwest of the hearth (Figure 18). In the areas north and southwest of the hearth, extensive tool manufacturing occurred as well, however, there is enough distance between the tool manufacturing and hide-working areas to warrant an inference of both female and male activity. In Activity Area C, hide-working occurred southeast (Figure 19) and southwest of the hearth and south of the bone processing area. In Activity Area D, hide-working occurred northwest of the hearth in a bone processing area.

Cooking

The gender associated with cooking and consumption activities is more difficult to infer than gender associated with activities that are more sex-specific. All four hearths are characterized by drop and toss zones, and numerous burned bones and bone fragments are present. Hearth A (Figure 16) appears to be a men's communal hearth, therefore men were probably cooking and eating meat at this location. The hearth in Activity Area B (Figure 18) appears to have been used by both males and females, therefore, both men and women may have been cooking and consuming meat. Similarly, in Activity Area C, the spatial patterning and types of material remains present suggest that men sat west of the hearth manufacturing stone tools while women sat east of the hearth processing bone (Figure 19). Numerous burned bone fragments are present, suggesting that both men and women ate as they worked. Finally, in Activity Area D (Figures 20, 21, and 22), the types of artifacts present and the way they are patterned indicates that men sat west and south of the hearth manufacturing stone tools, while women sat east and northeast of the hearth cutting meat and processing bone, both presumably eating as they worked.

Conclusions

Activity Area A (Figures 16 and 17) was multi-functional and was used by both men and women. At least six individuals, including males and females, utilized the activity area. Three men occupied the northern, southern, and eastern sides of the hearth manufacturing stone tools and eating while they worked. Four women worked northeast,

southeast, northwest, and further east of the hearth extracting marrow, cutting meat, scraping bones, and processing hides.

Activity Area B (Figure 18) was created by the work of at least five individuals. Three women worked around the hearth warming bones, extracting marrow, processing, cooking, and consuming bison meat, while two men sat west of the hearth making and reworking stone tools, and ate while they worked. Like Activity Area A, Activity Area B appears to have been multi-functional and was not sex-specific.

Activity Area C (Figure 19) resulted from activities carried out by at least seven individuals. Three males were situated on the southern and western sides of the hearth, and northwest of the hearth, making stone tools and manufacturing or maintaining arrow shafts. At least two females sat northeast and southeast of the hearth processing bones and resharpening their tools as they worked. At least two other women worked southwest of the hearth processing bone. This was a multi-functional Activity Area that was not sex-specific.

At least eight individuals participated in creating Activity Area D (Figures 20, 21, and 22). Three men sat on the west, south, and southwest sides of the hearth manufacturing stone tools and eating while they worked. One woman sat further west of the hearth scraping bones and resharpened the tools she was using, and another woman sat southwest of the hearth extracting marrow, scraping bones, and working hides. At least two other women were situated east and northeast of the hearth extracting marrow from bison bones. Like the other three activity areas, Activity Area D was a multi-functional area and was not sex-specific.

IX. Discussion

The application of the task differentiation approach and ethnographic and ethnoarchaeological data to the study of material remains at the Fisher site helps to highlight similarities and differences in the kinds of activities males and females performed, as well as relationships between activities and dimensions of task variation. The task differentiation framework emphasizes several realms which should reveal associations between activities and dimensions of task variation (Spector 1983 & 1989). These include seasonality, task organization, and temporal, spatial, and material dimensions of activities (Spector 1983 and 1989). Information on seasonality can be obtained from faunal remains, while information concerning task organization and temporal, spatial, and material dimensions can be obtained from maps of the material remains which comprise the activity areas at a site (Spector 1989 & 1989)..

Fetal bison remains from the Late Prehistoric component of the Fisher site indicate that the site was occupied during the transition from late winter to early spring, probably in March. Task organization, including the proximity of activities and the locations where they were carried out, was revealed from maps made during excavations.

Maps of artifacts and features associated with individual activities helped define the boundaries of the four activity areas analyzed, and revealed that they were multi-functional, i.e., not limited to a specific activity. Patterning and amounts of material remains also allowed for inferences regarding the number of individuals involved in each task. Although the site appears to have been occupied just long enough to process the

bison products from the kill, the precise frequency and duration of each task could not be determined.

Once the activity areas were mapped, ethnographic and ethnoarchaeological data on Northern Plains bison hunting groups and the Alaskan Nunamiut was used to identify the specific activities that occurred as well as the gender associated with them. After identifying activities performed by males and females in the ethnographic and ethnoarchaeological records, and the material by-products created as a result of them, it was possible to make inferences about activities which occurred at the Fisher site, as well as the gender which produced the material remains present.

Ethnographic data regarding Northern Plains bison hunters confirm that women processed meat, hides, and bone, and performed secondary butchering activities, while men were responsible for the manufacture and maintenance of weapons and stone tools used in hunting and warfare. Assuming that activities among male and female Northern Plains bison hunters were similar in recent prehistory, it is possible to define the gender associated with particular activities that occurred at the Fisher site.

Task settings, or spatial dimensions of tasks, were quite similar for male and female activities at the Fisher site. Both male and female activities were centered around outdoor cooking hearths, although males tended to work on the western side while females worked on the eastern side of hearths. Both males and females appear to have engaged in post-kill subsistence-related activities, although males were primarily involved in the manufacture and maintenance of stone tools used in hunting and warfare, while females performed activities such as processing bison meat, bones, and hides.

Because males and females appear to have shared several of the hearths at the Fisher site, the temporal dimensions of their work were probably similar. This pattern would probably not emerge at kill-sites, or at campsites that were occupied for long periods of time, as most ethnoarchaeological studies have shown that males and females do not work consistently at the same time in the same locations.

The material dimensions of male and female task differentiation were quite varied, although there was some overlap. Material items associated exclusively with males include tools associated with hunting and weaponry, and tools used to manufacture and maintain weapons. Artifacts associated exclusively with females include end scrapers, the tools which comprise a tanning kit, and activity sets which indicate extensive bone processing activities. Material remains associated with both males and females include resharpening flakes and remains created by consumption activity.

It is interesting to note similarities in the sizes of the four activity areas analyzed. Activity Areas A and B are 19 and 18 square meters respectively, while Activity Areas C and D are 25 and 26 square meters respectively. The similar sizes of the activity areas may indicate that the same number of people were involved in tasks being carried out in each area. Individuals working in different activity areas may have belonged to different kin groups, as gender-specific activity areas are not indicated. The different sizes of activity areas may suggest the presence of cooperating societies at the Fisher site. On the other hand, the fact that pottery sherds characteristic of both groups were recovered from a single activity area may indicate functional rather than cultural differences.

In sum, the application of the task differentiation framework and ethnographic and ethnoarchaeological data to the study of the Fisher site revealed information regarding the spatial, temporal, and material dimensions of task organization as well as the types of activities performed by males and females. Ethnographic and ethnoarchaeological information was particularly useful in defining gender associated with specific activities and specific sets of activities.

Males and females performed identical tasks in almost all Northern Plains bison hunting groups (Guenther 1991:17; Hughes 1991:35; also see Table 7 p.72). This sexual division of labor, as well as gender relations, may have changed substantially as a result of the acquisition of European trade goods, especially the horse and the gun (Albers 1989:138-144; Bonvillain 1989:1-25; Klein 1980:134-135; Martin and Voorhies 1975:210-211; Morgen 1989:3; Spector and Whelan 1989:77). For instance, prior to the acquisition of the horse, the economy of Plains buffalo hunting groups was a communal affair in which both women and men were involved (Albers 1989:142). Once horses were acquired, women had no direct role in buffalo hunting, and spent a greater amount of time processing meat and hides to be traded for European goods (Albers 1989:142, Klein 1980:134). If indeed the status of Plains women was largely determined by the amount of control they had in subsistence production (Sassaman 1992:73), the status of women probably declined after the horse was acquired.

Once guns were acquired, it may have no longer been necessary for men to devote a substantial amount of time and energy to manufacturing weapons and stone tools used in hunting and warfare. The horse provided for increased mobility, and men may have been

away from camp for longer periods than in pre-horse times, therefore, material remains at such campsites are likely to reflect more female than male behavior. These changes affected gender roles and gender relations (Albers 1989:138-144; Bonvillain 1989:1-25; Klein 1980:134-135; Martin and Voorhies 1975:210-211; Morgen 1989:3; Spector and Whelan 1989:77), and material remains from post-contact sites are likely to reflect such changes. Comparing gender-specific activities from pre- and post-contact sites may elucidate differences in gender relations during these times, and provide for interpretations of how gender relations changed through time.

X. Conclusions

The goal of this research was to identify the gender associated with activities and activity sets within four subsistence-related activity areas at a Late Prehistoric bison processing site in eastern Wyoming. Quantitative, qualitative, and statistical methods, Janet Spector's task differentiation framework, and ethnoarchaeological data were applied in analyzing spatial patterning and contextual associations among material remains, while ethnographic and ethnoarchaeological information was used to assign gender to specific sets of artifacts and material remains.

Activity areas were recognized by clusters of artifacts, lithic debitage, bone refuse, and hearths. Material remains were mapped in order to locate concentrations of artifacts as well as features and boundaries, which made the identification of activity areas possible. Specific activities that occurred were identified by tools and other artifacts present as well as the context in which they were found. Variance to mean ratios indicate that clusters of artifacts exist in each of the four activity areas identified. The clusters of artifacts within each activity area are very similar and indicate that a variety of subsistence-related activities occurred.

The most visible activities probably represent abandonment phase activities, an inference which is supported by the characteristics of the material remains present. It is also likely that the material remains are in primary context due to the abundance of tools made of locally-available materials which refit to the same core and the percentage of butchering implements present.

All four activity areas are multi-functional, and no activity appears to have been restricted to a special-use area. Material remains present in each activity area are alike in terms of tool types and refuse, and indicate that the site was occupied just long enough to process bison meat and hides, restore and replace hunting equipment, and possibly dry some meat for storage. Numerous activities were inferred based on the patterning and types of material remains present. Major site activities include the manufacture and maintenance of stone tools used for meat and bone processing, bone and hide-working, and weapons; the preparation of meat for immediate consumption and possibly storage; and craft activities.

The methods employed proved useful in discerning gender from material remains in the Late Prehistoric component of the Fisher site. All of the tool manufacturing areas are characterized by extensive lithic debitage and tools used as weapons. Only males have been observed or recorded as having produced weapons-related tools, so these activity sets are inferred as denoting male activity. The fact that weapons maintenance occurred in close proximity to extensive manufacture of stone tools used in hunting and warfare supports this interpretation.

Resharpening activity is indicated in a number of locations throughout the four activity areas analyzed. It is present in locations where both female and male activities occurred, including marrow extraction, bone processing, hide-working, consumption, and secondary butchering, and therefore indicate that both males and females resharpened the tools they were using as necessary. Unlike extensive tool manufacturing, resharpening does not appear to be a sex-specific activity.

According to ethnographic and ethnoarchaeological accounts, marrow extraction and bone scraping are not sex-specific activities, however, women are reported as having participated in them to a greater extent than men. For this reason, areas where large-scale bone processing occurred in conjunction with other female activities are inferred as denoting female activity, while smaller-scale marrow extraction associated with material remains indicative of male activity are inferred as denoting male activity

Ethnographic and ethnoarchaeological information indicates that hide-working and secondary butchering are sex-specific tasks always performed by females. For this reason, material remains indicative of hide-working and meat cutting are inferred as representing female activity. The fact that secondary butchering often occurred at locations where other female activities occurred strengthens the interpretation of this activity as reflecting female behavior.

Female craft specialists and children are known to have made bone beads. Assuming that the beads recovered from the Fisher site were cut during the time the site was occupied, a female adult craft specialist or child probably performed the activity.

Finally, both males and females have been observed cooking, however, males only cooked items for immediate consumption. Material remains indicate that consumption occurred among all individuals working in the four activity areas analyzed. Gender associated with material evidence of cooking and consumption at the Fisher site was determined by the presence of associated sex-specific activity sets reflecting male or female behavior.

In sum, all four activity areas analyzed are multi-functional: a variety of activities occurred in each area, and no activity was restricted to a special-use area. In addition, none of the activity areas analyzed was sex-specific. Although a sexual division of labor is present, it appears that, at least at the Fisher site, males and females used similar working spaces, worked in close proximity to one another, and carried out their tasks simultaneously.

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